Narcotics & Other Substances

Subject to the Controlled Substances Act of 1970

Public Law 91-513

A Monograph

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INTRODUCTION

This monograph is designed as a ready reference for Bureau personnel requiring quick access to terminology, definitions and classification of controlled substances and their synthesis and/or methods of extraction.

It summarizes and describes briefly all of the narcotics and dangerous drugs controlled under the five schedules of the Comprehensive Drug Abuse Prevention and Control Act of 1970 and the regulations issued thereunder. Certain drugs of major importance, such as opium, heroin and cocaine, are described in detail.

Substances are listed alphabetically according to the international nonproprietary names recommended by the World Health Organization, wherever such are available, otherwise the name most commonly found in the literature is used. Differentiations between the pure substance and its salts are included for the purpose of identifying the % of anhydrous bases. Only those isomers, derivatives, cogeners, homologs, analogs, isosters or salts which have been synthesized are listed. However, certain related non-controlled substances are included simply because they may be encountered.

Several narcotic substances not appearing in the Law have been added to the appropriate schedules as these are controlled under the several International Conventions, Treaties and Protocols. As a signatory to these documents, the United States is obligated to apply similar controls.

No attempt has been made to list all applicable trade names, manufacturers or formulations. Only the more common synonyms and trade names are listed.

With the constant introduction of new medicinals and the retirement of old ones, such voluminous listings would be of doubtful value and would require such constant revising so as to preclude any practical application; especially since the labels of all products controlled under this Act are required to bear the symbol of the appropriate schedule.

Section 202(a) of the Law requires the Bureau to update and republish a listing of the five schedules on a semi-annual basis during the two year period beginning one year after the date of enactment and on an annual basis thereafter. The reader may consult the most recent revision of the Code of Federal Regulations, Title 21 Chapter II, Part 300 to End for the most up to date listing of controlled and scheduled drugs.

The author takes satisfaction and pleasure in acknowledging the exceptionally capable assistance, advice and criticism of Dr. Floyd Anderson, Mr. Joseph N Gaydos, Mr. Howard McClain, Agent Larry Slotnick and Dr. Robert P. Zendzian.

GENERAL INFORMATION
Title II - Part C

<u>Sections 302, 303 and 304-Registration of Manufacturers, Distributors and Dispensers of Controlled Substances</u>

All persons who import, export, manufacture, produce, formulate, compound, dispense, administer or in any manner deal in any substances controlled in Public Law 91-513 must be properly registered by the Attorney General, (Drug Enforcement Administration). Agents of registrants, such as nurses, employees, common carriers, warehousemen or ultimate users are excepted from registration.

A separate registration is required for each principal place of business where controlled substances are manufactured, distributed or dispensed. Registration under the Federal Law is predicated on compliance with all applicable State and local law.

Every registrant's activity is governed by his registration in a particular category. For example, a pharmacy that is registered as a retailer only, may receive, fill and dispense a practitioner's prescription. However, he may not wholesale or supply the needs of another registrant. To do so, he must register as a wholesaler. Conversely, a manufacturer or wholesaler may not fill prescriptions unless they are registered, additionally, as pharmacies.

Retail pharmacies, hospitals/clinics, teaching institutions, practitioners, i.e., physicians, dentists, veterinarians, researchers, etc. register on Form BND 224. Manufacturers, distributors (wholesalers), researchers, analytical laboratories, importers and exporters register on Form BND 225.

Forms should be properly completed and mailed to the United States Department of Justice, Drug Enforcement Administration, P. O. Box 28083, Central Station, Washington, D. C. 20005 along with the appropriate fee as follows:

FORM DEA-224

Retail Pharmacy	$ 5.00
Hospital/Clinic	5.00
Practitioner (MC, DDS, DVM, etc.)	5.00
Teaching Institution	5.00

FORM DEA-225

Manufacturers	$50.00
Distributors (wholesalers, jobbers, etc.)	25.00
Researchers	5.00
Analytical Laboratory	5.00
Importer	25.00
Exporter	25.00
Import Broker/Forwarder	25.00
Export Broker/Forwarder	25.00

<u>Section 305-Labeling and Packaging Requirements</u>

An identifying symbol must appear on the principal label of each commercial container for each substance, compound or preparation in each schedule. A different symbol is required for each schedule. Manufacturers are required to designate on the label of each substance, compound or preparation, by means of a large, clear open letter "C" with the appropriate Roman numerial inserted in the center thereof, the schedule classification for that specific product; i.e., C I C II C III C IV or C V or C-I, C-II, C-III, C-IV or C-V may be used.

The word "schedule" need not be used. On over-printed labels, ink of contrasting color affording clear legibility should be used. When not extended across other printing, the same color ink may be used.

Prescription labels are not required to bear such symbols; however, they may be used if desired. The pharmacist may wish to use a different code or symbol to distinguish between Schedule II and Schedules III, IV and V preparations, since separate files for Schedule II preparations are required. (See Section 307(b) of Title II.)

Section 503(b) of the Federal Food, Drug and Cosmetic Act promulgates authority and Section 305(c) of this Act requires that the label of a drug listed in Schedules II, III or IV shall, when dispensed to or for a patient, contain a clear concise warning that it is a crime to transfer the drug to any person other than the patient for whom it was intended.

Additionally, some state laws require practitioners (physicians, dentists, veterinarians), upon dispensing Schedule V preparations, to affix to the container a label bearing the dispener's name and signature, his state registry number, the date on which dispensed, and the purchaser's name. This is in addition to any other label(s) already affixed to the container.

All containers of controlled substances in Schedule I or II, and narcotic drugs in Schedule III or IV must bear a seal (strip, band or cap seal) and be securely affixed to the container at two points and in such a way that upon opening the container the seal will be destroyed. In the case of single dose, hermetrically sealed, ampoules, the seal may be affixed to the outer carton or container. Further, the seal should be distinguishable in order (1)that it may be identified as an authentic seal, (2)that any data appearing there on it may be easily read, and (3)that an inspection will reveal at any time whether the seal remains intact.

Section 306-Quotas Applicable to Certain Substances

As a signatory to the several international treaties, conventions and protocols, the United States is obligated to submit estimates for its medical, scientific research and industrial needs of narcotic substances. Once these estimates are submitted to the International Narcotic Control Board they become binding upon the United States. The international estimate system had its genesis in the 1931 Convention for Limiting the Manufacture and Regulating the Distribution of Narcotic Drugs, signed at Geneva on July 13, 1931 and amended by a Protocol signed at Lake Success, New York on December 11, 1946.

Basically, these treaties require us to limit the importation of crude opium and raw coca leaves to the minimum quantities necessary to meet our needs for consumption, conversion, exports, government stocks and national inventories of the several narcotic derivatives, cocaine and the many synthetically produced narcotic drugs thus precluding excess production which could find its way into illicit channels.

Consumption of all controlled substances is established by the prescribing habits of the practicing physicians. Therefore, all substances and their preparations sold below the wholesale level are considered "consumed".

Conversion estimates consist of those substances which may or may not have medical utility and are used for conversion to other substances. Examples of the foregoing are the methylation of morphine into codeine, the methylation of dihydromorphine(an unavoidable by-product in the synthesis of morphine into dihydromorphinone-Dilaudid-Knoll) to dihydrocodeine or metazocine which, likewise, is without any present medical usage. It is, however, a necessary

intermediate in the production of phenazocine, a potent synthetic compound. Other drugs such as thebaine and ecgonine which have no medical significance of themselves but serve as intermediates for other drugs are treated as drugs of conversion.

The quantities of drugs exported from the United States is relatively small when compared to the total domestic production. Many economical factors and variables restrict our participation in the international narcotic market.

Desired inventory levels are established for a six to twelve month supply depending on the annual consumption; and, in the case of some opium derivatives, an 18 month inventory is considered desirable because of our great distance from the source of supply and the time consuming extraction procedures.

Thus, total domestic manufacture of narcotic drugs is governed by the estimated requirements and the internal control is accomplished (1)controlling the quantity of the raw materials available to each manufacturer; (2)limiting the manufacture of substances by means of an annual manufacturing quota issued to each manufacturer for each basic drug; (3)auditing quarterly reports accounting for all details of import, purchase, manufacture and sale; and (4)conducting periodic inspections of plants and inventories of stocks on hand.

The assignment of manufacturing quotas is based on each company's requirements as reflected by consumption at the prescribing levels. Each company submits an application for a quota (Form 189) containing the following information: (1) previous year's disposition or average disposal for the three prior years, whichever is greater and (2)50% of the company's net disposals. The sum of

these two entries less the existing inventories as of December 31 represents his apparent requirements. The firm's quota is then based on his percent share of the estimated national requirements.

In fixing yearly manufacturing quotas for each basic class of controlled substance, the Bureau considers the total needs for the procurement of such drugs for further manufacturing, processing or formulation by registered "formulators" or "manufacturers" who do not hold quotas to manufacture such basic class of substances (form 250). These firms are issued "procurement quotas" and these quotas may not be exceeded unless authorized by DEA.

It is important to note that while the United States is obligated to "live" within the estimates submitted to the International Narcotic Control Board, there are provisions in the treaties allowing us to submit amended estimates if they are warranted. Such justifications would be epidemics, national disasters, etc. However, the normal consumption of all controlled substances is established by the medical practitioner through his prescribing habits, and these habits are of course subject to periodic changes depending on the introduction of new medicinals and the retirement of old preparations. The estimates are in no way designed to control the prescribing patterns of the medical practitioner. Pharmaceutical research is constantly striving to introduce new analgesic compounds without attendant addictive or habit-forming liabilities. However, many hiatuses exist in our knowledge and such compounds still elude us.

<u>Section 307-Records and Reports of Registrants</u>

This section requires every registrant, except prescribing and administering practitioners, to take a physical inventory of all controlled substances on a

biennially basis. The narcotic inventory must be maintained separately; however, the non-narcotic inventory may be incorporated and maintained with regular business records provided it is readily retrievable and available for inspecting and copying by authorized government personnel. Both inventories must be kept by the registrant at his place of business for at least two years. (See Section 307(b) and sample inventory-Appendix V.)

Manufacturers of Schedules I, II, III and V narcotics as well as Schedule II non-narcotics and wholesale dealers are required to render reports, and annual inventories on all narcotic substances on Form DEA 333.

The alkaloidal manufacturers, i.e., those who import the crude opium and raw coca and extract the phenanthrene alkaloids and coca derivatives, report all their activities on Forms 247 and Form 168, respectively. See Table I for production and utilization of these substances.

Schedules of Drugs - Section 202

SCHEDULE I

Criteria:

A. The drug or other substance has a high potential for abuse.
B. The drug or other substance has no currently accepted medical use in treatment in the United States.
C. There is a lack of accepted safety for use of the drug or other substance under medical supervision.

Substances listed in this schedule are those natural occurring alkaloids, synthetic and semi-synthetic substances which have a high potential for abuse and no accepted or recognized medical use in treatment in the United States. It was the intent of Congress that Schedule I contain those compounds without medical utility and subject to research.

Their manufacture and distribution through the usual pharmaceutical channels for medical use are prohibited, and, to date, no applications for use have been made to the Food and Drug Administration under the Federal Food, Drug and Cosmetic Act.

However, some substances such as Pholcodine and Dextromaride are currently being researched. Determination as to whether these drugs will be permitted to be distributed for general use will depend upon the results of the clinical studies and approval by the Food and Drug Administration.

Imports and exports of substances in this schedule may be made for scientific purposes only and pursuant to import and export permits as provided in Title III of the Controlled Substances Import and Export Act.

SCHEDULE II

Criteria:

A. The drug or other substance has a high potential for abuse.
B. The drug or other substance has a currently accepted medical use in treatment in the United States or a currently accepted medical use with severe restrictions.
C. Abuse of the drug or ther substances may lead to severe psychological or physical dependence.

Substances listed in Schedule II are opium and certain of its preparations, those phenanthrene alkaloids of opium and their semi-synthetic derivatives such as hydrocodone and dihydromorphinone; synthetic opiates; cocaine and certain anoretic compounds; namely, amphetamine, methamphetamine, methylphenidate, phenmetrazine; amobarbital, secobarbital, pentobarbital and methaqualone. All, with the exception of the anorectics, the barbituric acid derivatives and methaqualone were formerly considered "class A" narcotics. While these substances possess a high potential for abuse, they do have accepted medical use in the United States and most, but, not all, are currently available

to the medical and pharmaceutical professions. Order forms are required for their transfer and a signed, written prescription of a practitioner for their dispensing unless dispensed personally by the practitioners. Pharmacists may not accept the practitioner's oral or telephone orders except in cases of emergencies as provided in Section 309(a) of Title II. Prescriptions for substances and their preparations listed in this schedule may not be refilled.

It was Congressional intent that compounds in Schedule II possess medical utility; however, substances such as Methadone Intermediate and Pethidine Intermediate are without currently recognized medical use in treatment in the United States. These compounds are included in Schedule II because they are precursors within the synthetic processes and are capable of being readily converted to substances in Schedule II that possess addiction-forming or addiction-sustaining liabilities. These intermediates may be manufactured, isolated, weighed and analyzed as incidental steps in the synthesis of other drugs. They may not be removed from the process and used for any other purposes. Similarly, such substances as ecgonine and tropacocaine are considered to be precursors of cocaine and are also listed in this schedule.

No substances listed in Schedule II may be imported, except those quantities of crude opium and raw coca as may be necessary to meet the medical, scientific or other legitimate needs of the country. Importation of other substances in this schedule may be authorized for research purposes only, provided such substances are not readily available from sources within the United States, unless questions of origin, types of particular methods of production are elements of the research objectives, or in a national emergency. All imports and exports of Schedule II substances must be made pursuant to permits as provided in Section 1002 and 1003 of Title III.

SCHEDULE III

Criteria:

A. The drug or other substance has a potential for abuse less than the drugs or other substances in schedules I and II.
B. The drug or other substance has a currently accepted medical use in treatment in the United States.
C. Abuse of the drug or other substance may lead to moderate or low physical dependence or high psychological dependence.

This schedule contains substances classified as stimulants, certain depressants, hypnotics, narcotic antagonist and those preparations containing narcotic drugs or any salts thereof in limited quantities. Preparations and compounds of substances in this schedule may be prescribed or dispensed by registered practitioners, and pharmacists may accept the practitioners' oral or telephoned prescriptions. Such prescriptions may be refilled five times within a six month period, if authorized by the prescriber. The pharmacist must obtain a new prescription, either oral or written, after the expiration date of six months or after the fifth refill. He may not continue to refill the same prescription even though authorized by the prescribing physician. Schedule III substances may be transferred between (qualified) registrants without benefit of an official order form.

It should be noted that this permissive feature of the law does not authorize the filling of oral or telephone narcotic prescriptions in violation of the narcotic laws of the States, Territories, or the District of Columbia. Therefore, the practitioner or pharmacist, should ascertain from his local authorities whether the locally applicable narcotic law authorizes the filling of oral narcotic prescriptions to the extent permitted by the Federal Law.

Narcotic preparations in this schedule may be imported for scientific purposes only as defined in Title III. However, they may be exported for medical use pursuant to official narcotic import and export permits.

Other controlled substances in this schedule may be imported provided the importer declares and notifies the Bureau of the pending import of Form DEA-236. They may be exported pursuant to documentary proof that the importation is not contrary to the laws and regulations of the foreign government and a copy of Form DEA-236 is forwarded to the Bureau 15 days prior to exportation. See Section 1003(e) of Title III.

SCHEDULE IV

Criteria:

A. The drug or other substance has a low potential for abuse relative to the drugs or other substances in schedule III.
B. The drug or other substance has a currently accepted medical use in treatment in the United States.
C. Abuse of the drug or other substance may lead to limited physical dependence or psychological dependence relative to the drugs or other substances in schedule III.

This schedule contains those substances classified as depressants, certain tranquilizers and hypnotics.

As in Schedule III, these preparations may be dispensed pursuant to oral or telephone prescriptions and refilled five times in a six month period if authorized by the prescriber. Order forms are not required for their transfer and they may be imported or exported under the same regime as that for Schedule III substances.

SCHEDULE V

Criteria:

A. The drug or other substance has a low potential for abuse relative to the drugs or other substances in schedule IV.
B. The drug or other substance has a currently accepted medical use in treatment in the United States.
C. Abuse of the drug or other substance may lead to limited physical dependence or psychological dependence relative to the drugs or other substances in schedule IV.

Schedule V substances include those that were formerly known as "class X" or exempted narcotic preparations", i.e., they were exempt from the taxation and in some cases the prescription requirements of taxable narcotics.

The conditions for over the counter sale of such preparations are as follows:

1. They may be sold at retail level by a registered pharmacist for bona fide medical purposes only. However, an authorized employee acting under his immediate direction may consummate the sale.

2. The name and address of the recipient, the name and quantity of the preparation and the date of sale must be recorded. If the purchaser is unknown to the pharmacist, the latter must require suitable identification.

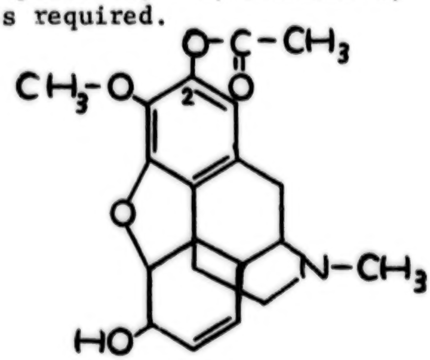
3. The sales of these preparations may not be made to persons under 18 years of age, and such sales may not exceed 8 ounces of any product containing opium, nor more than 4 ounces of any product containing codeine, or dihydrocodeine or ethylmorphine within 48 hours.

The preceding conditions for sale of these products relate only to their status under the Federal Law. It is the responsibility of each person manufacturing or handling such preparations to make certain that his activities are also in comformity with the requirements of his state and local laws.

SECTION I

Compounds are listed alphabetically, followed by schedule designation, CSA drug code number and the Bureau form numbers required for their import and/or export. Empirical and structural formulae, molecular weights and the percent of anhydrous base, where applicable, are also listed.

1. ACETOCODEINE
   Acetylated codeine with acetyl group at position, C-2; Schedule I; No CSA Code assigned; Import/Export permits required.

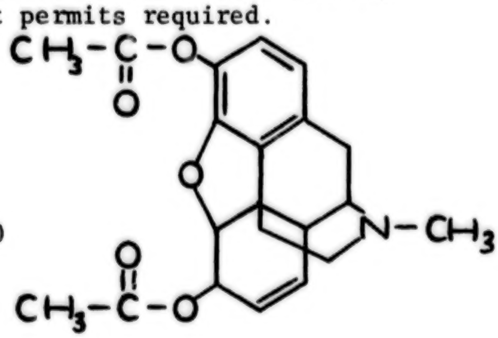


$C_{20}H_{23}NO_4$

Molecular weight - 341.16

HCl - Percent of anhydrous base - 92.02

2. ACETOMORPHINE
   Synonym for diacetylmorphine, (Heroin); diamorphine. Manufacture, sale, distribution or possession is prohibited in the United States; Schedule I; CSA Code #-9200; Import/Export permits required.

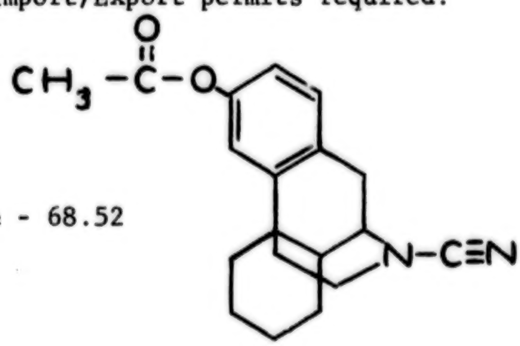


$C_{21}H_{23}NO_5$

Molecular weight - 369.40

HCl - Percentage of anhydrous base - 87.00

3. 1-3-ACETOXY-N-CYANOMORPHINAN
   Schedule I; No CSA Code assigned; Import/Export permits required.



$C_{18}H_{21}O_2N \cdot CN$

Molecular weight - 337.47

Bitartrate - Percent of anhydrous base - 68.52

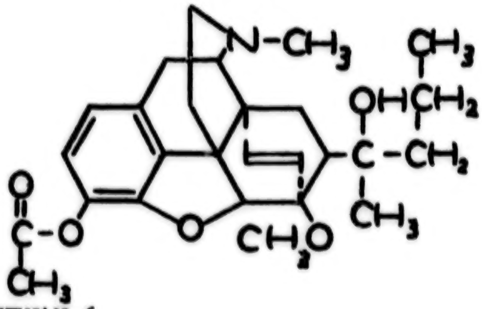
3. ACETORPHINE

3-Acetyl, 6-methoxy, 14-endoetheno, 7-(2-hydroxy-2-pentyl) tetrahydro-oripavine; M-183; N.I.H. 8974; Schedule I; CSA Code #-9319; Import/Export permits required.

$C_{27}H_{35}NO_5$

Molecular weight - 453.56

HCl - Percentage of anhydrous base - 92.55



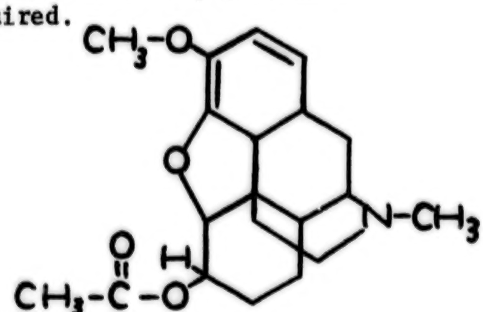
4. 6-ACETOXY-3-METHOXY-N-METHYL-4, 5-EPOXY-MORPHINAN-6

Acetyldihydrocodeine; Acetylcodone; a codeine derivative; Schedule I; CSA Code #-9051; Import/Export permits required.

$C_{20}H_{25}NO_4$

Molecular weight - 343.37

HCl - Percentage of anhydrous base - 96.30

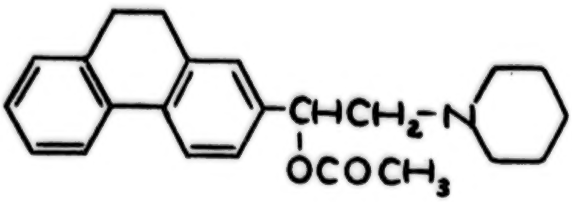


5. 2-(ACETOXY-2-PIPERIDINO ETHYL), 9, 10-DIHYDROPHENANTHRENE

7(2-acetoxy-2-piperidine ethyl); N.I.H. 7617; Schedule I; No CSA Code assigned; Import/Export permits required.

$C_{23}H_{27}NO_2$

Molecular weight - 347.477



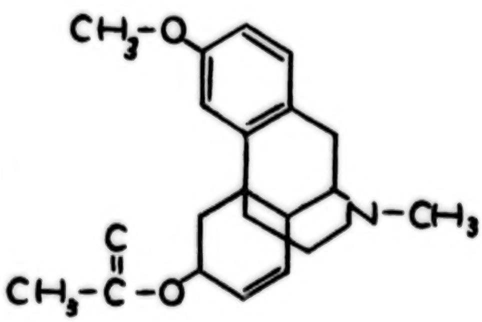
6. ACETYLCODEINE

Schedule I; a codeine ester formed by heating codeine with acetic acid or acetic anhydride. CSA Code #-9105; Research only; Import/Export permits required.

$C_{18}H_{20}O_3N(C_2H_3O)$

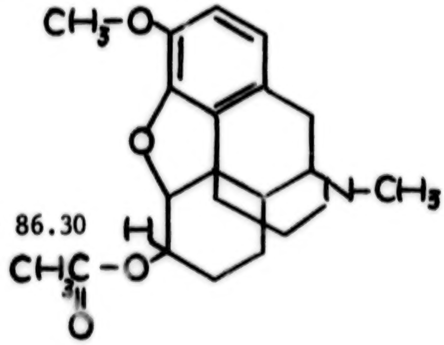
Molecular weight - 341.16

SO_4 - Percent of anhydrous base - 77.67



7. ACETYLCODONE

Acetyldihydrocodeine; a codeine derivative; formed from action of acetic anhydride on dihydrocodeine; Schedule I; CSA Code #-9051; Research only; Import/Export permits required.



$C_{20}H_{25}NO_4$

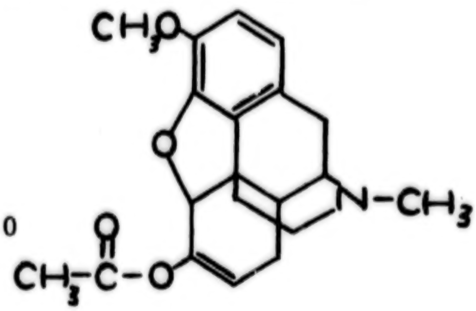
Molecular weight - 343.37

HCl (monohydrate) - Percentage of anhydrous base - 86.30

HCl - Percentage of anhydrous base - 90.40

8. ACETYLDEMETHYLDIHYDROTHEBAINE

Acedicon; Thebacon; Schedule I; CSA Code #-9315; Research only; Import/Export permits required.



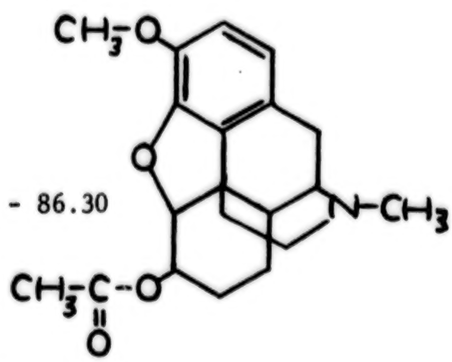
$C_{20}H_{23}NO_4$

Molecular weight - 341.39

HCl - Percentage of anhydrous base - 90.0

9. ACETYLDIHYDROCODEINE

Acetylcodone; a codeine derivative; Schedule I; CSA Code #-9051; Research only; Import/ Export permits required.



$C_{20}H_{25}NO_4$

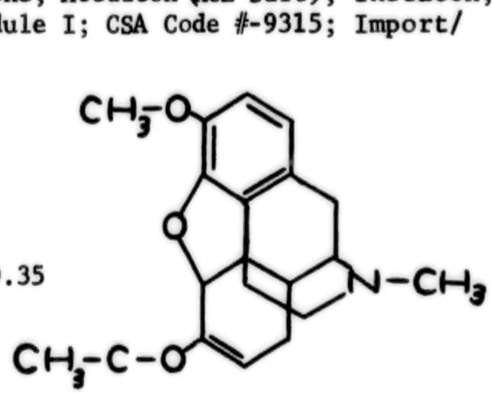
Molecular weight - 343.37

HCl (monohydrate) - Percentage of anhydrous base - 86.30

HCl - Percentage of anhydrous base 90.40

10. ACETYLDIHYDROCODEINONE

Dihydrocodeinone enol acetate; acetyldemethyldihydrothebaine; 3-methoxy, 6-acetoxy, 8-10-dihydrocodeinone; Acedicon (HCL Salt); Thebacon; a derivative of dihydrocodeinone; Schedule I; CSA Code #-9315; Import/ Export permits required.

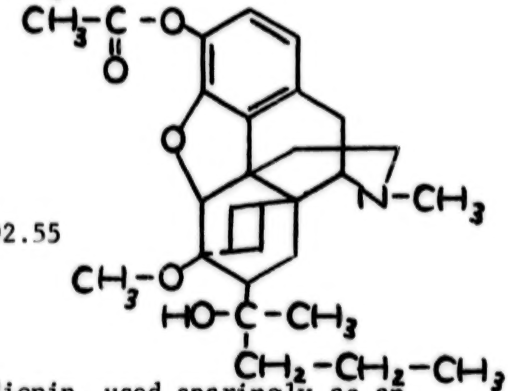


$C_{20}H_{23}NO_4$

Molecular weight - 341.39

HCl - Percentage of anhydrous base - 90.35

11. 3-ACETYL-6, 14-ENDOETHENO-7 (2-HYDROXY-2-PENTYL) TETRAHYDRO-ORIPAVINE
A thebaine derivative; M-183; Acetorphine N.I.H. 8974; Schedule I; CSA Code #-9319; Import/Export permits required.

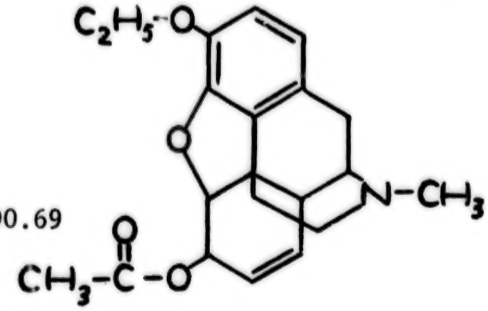


$C_{27}H_{35}NO_5$

Molecular weight - 453.56

HCL - Percentage of anhydrous base - 92.55

12. ACETYLETHYLMORPHINE
3-ethyl, 6-acetylmorphine; Acetyl-dionin, used sparingly as an antitussive and in some former ophthalmic preparations. Cough syrups; Schedule I; Research only in U.S.A.; "Anarcoina", (Italy); No CSA Code assigned; Import prohibited except for scientific purposes. See Title III of C.S A

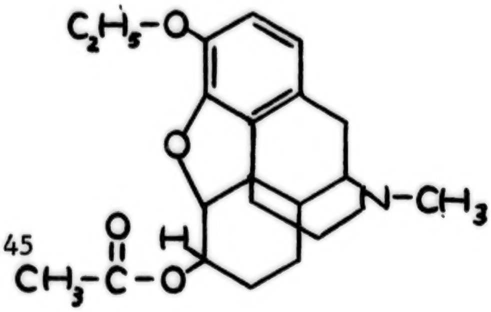


$C_{21}H_{25}NO_4$

Molecular weight - 355.50

HCl - Percentage of anhydrous base - 90.69

13. 6-ACETYL-3-(ETHOXY)DIHYDROMORPHINE
N I H.7623; Schedule I; No CSA Code assigned; Research only; Import/Export permits required.

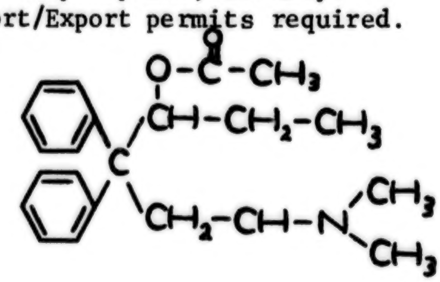


$C_{21}H_{27}NO_4$

Molecular weight - 345.51

HCl - Percentage of anhydrous base - 90.45

14. ACETYLMETHADOL
Acemethadone, Amidolacetate; Race-acetyl-methadol; 6-dimethylamino-4, 4-diphenyl-3-heptanol acetate; 4,4-diphenyl-(dimethylamine-3-acetoxy-heptane; 6-dimethylamine-4, 4-diphenyl-3-acetoxy-heptane; metha dyl acetate); Schedule I; CSA Code #-9601; Import/Export permits required.



$C_{23}H_{31}NO_2$

Molecular weight - 353.49

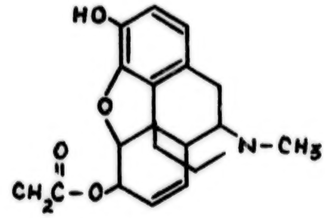
HCl - Percentage of anhydrous base - 89.99

15. ACETYLMORPHINE

6-monoacetylmorphine; a compound formed from the incomplete hydrolysis of diacetylmorphine, (Heroin); quantities of unacetylated morphine and monoacetylmorphine usually result in the synthesis of illicit Heroin. Schedule I; Research only; No CSA Code assigned; Import/ prohibited except for research purposes. See Title III of C.S.A.

$C_{19}H_{21}NO_4$

Molecular weight - 328.38

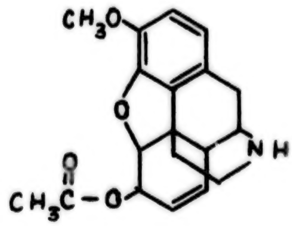


16. 6-ACETYLNORCODEINE

6-monoacetylnorcodeine; Schedule I; Research only; No CSA Code assigned; Import/Export permits required.

$C_{19}H_{21}NO_4$ •

Molecular weight - 345.38

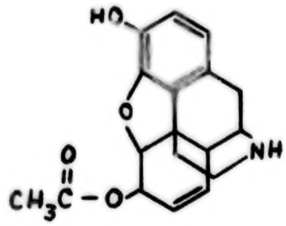


17. 6-ACETYLNORMORPHINE

Schedule I; Research only; CSA Code not assigned; Import/Export permits required.

$C_{18}H_{19}NO_4$

Molecular weight - 314.35

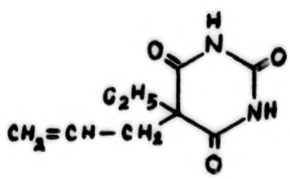


18. AETHALLYMAL

5-allyl-5-ethylbarbituric acid; Ethallobarbital; Dormin; Dorval; Schedule III; oral Rx; CSA Code #-2100; Form 236.

$C_9H_{12}N_2O_3$

Molecular weight - 196.06

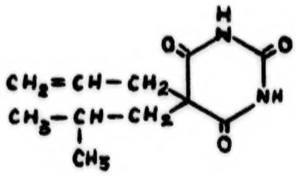


19. ALLISOBUMAL

Allylbarbital; butalbital; itobarbital; 5-allyl-5-isobutylbarbituric acid. See Abar-APC; Fiorinal; Paradol; Protension; Sandoptal and Tenstan; Schedule III; oral Rx; CSA Code #-2100; Form 236.

$C_{11}H_{16}N_2O_3$

Molecular weight - 224.25

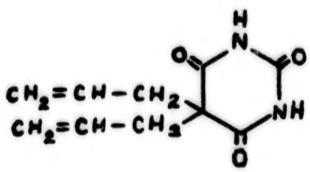


20. ALLOBARBITAL

Allobaritone; barbidal; dial; diallylbarbital; diallylmalonylurea; dialog; malil; malyl and novallyl; 5-5-diallylbarbituric acid; Schedule III; oral Rx; CSA Code #-2100; Form 236.

$C_{10}H_{12}N_2O_3$

Molecular weight - 208.21

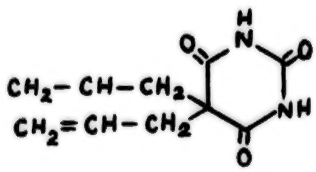


21. ALLOBARBITONE

Allobarbital; baridal; dial; diallylbarbital; diallymalonylurea; dialog; malil; malyl and novallyl; 5-5-diallylbarbituric acid; Schedule III; oral Rx; CSA Code #-2100; Form 236.

$C_{10}H_{12}N_2O_3$

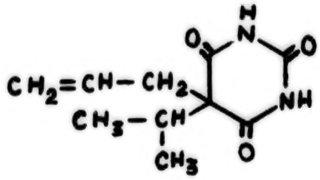
Molecular weight - 208.21



22. ALLOPROPYLBARBITAL

5-allyl-5-isopropylbarbital; aprobarbital; Schedule III; oral Rx; CSA Code #-2100; Form 236. See (Alurate-Roche); (Aprotal-Grail); (Spasmanol-Tilden-Yates).

$C_{10}H_{14}N_2O_3$

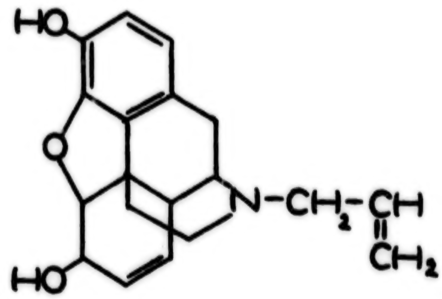


Molecular weight - 210.23

Na Salt - Percentage of anhydrous base - 90.14

23. ALLORPHINE
N-allylmorphine; antorphine; lehidrome; Nalline-Merck; nalorphine; Schedule III; CSA Code #-9400; Import/Export permits required. A morphine derivative, possessing slight analgesic properties; however, used as an antagonist in morphine or heroin poisoning. Not subject to international controls.

$C_{19}H_{21}NO_3$



Molecular weight - 311.37

HCl Salt - $C_{19}H_{21}NO_3 \cdot HCl$

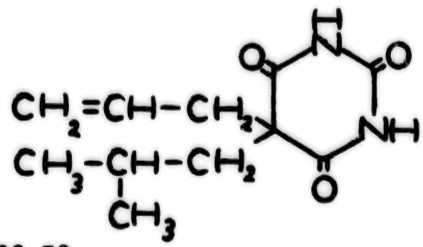
Percentage of anhydrous base - 89.52

HBr Salt - $C_{19}H_{21}NO_3 \cdot HBr$

Percentage of anhydrous base - 79.59

24. ALLYLBARBITAL
Alisobumal; butalbital; itobarbital; 5-allyl-5-isobutylbarbituric acid; Schedule III; oral Rx; CSA Code #-2100; Form 236. See Abar-APC; Fiorinal; Paradol; Sandoptal and Tenstan.

$C_{11}H_{16}N_2O_3$



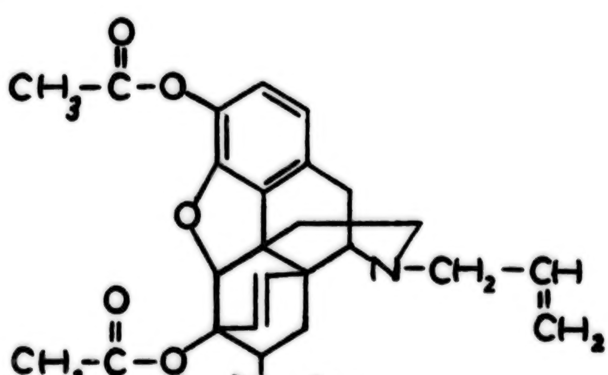
Molecular weight - 224.25

Na Salt - Percentage of anhydrous base - 90.70

25. N-ALLYL-(3-ACETYL-6), 14-ENDO ETHENO-7-(2-HYDROXY-2-PROPYL-TETRAHYDRONOR-ORIPAVINE
M-211; a thebaine derivative; Schedule I; No CSA Code assigned; Import/Export permits required.

$C_{28}H_{35}NO_6$

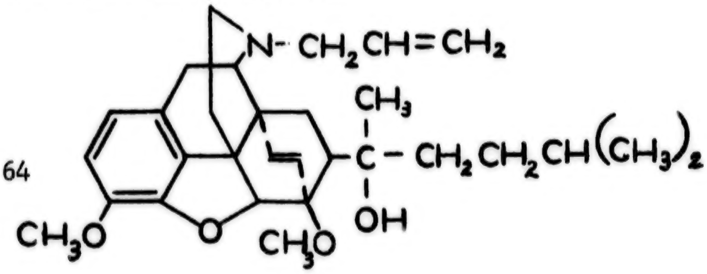
Molecular weight - 481.597



26. N-ALLYL-7-ALPHA-(1-HYDROXY-1, 4-DIMETHYLPENTYL)-6,7,8,14-TETRAHYDRO-6, 14-ENDO-ETHENONORTHEBAINE
M-233; a thebaine derivative; Schedule I; No CSA Code assigned; Research only; Import/Export permits required.

$C_{30}H_{41}NO_4$

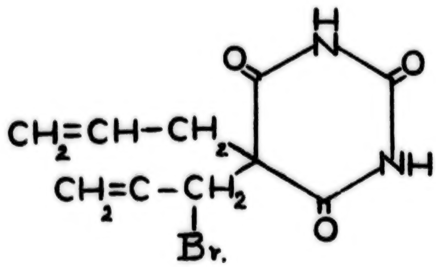
Molecular weight - 479.64



27. 5-ALLYL-5-(2-BROMOALLYL)-BARBITURIC ACID
Brallobarbital; Schedule III; oral Rx; CSA Code #-1100; Form 236.

$C_{10}H_{11}BrN_2O_3$

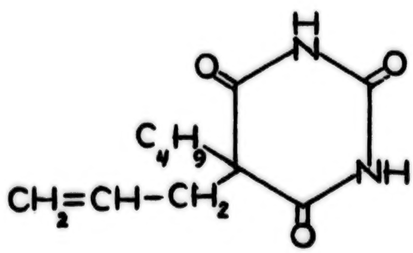
Molecular weight - 287.14



28. 5-ALLYL-5-N-BUTYLBARBITURIC ACID
N-Butylallylbarbituric acid; Dormupax; Idobutal; Schedule III; oral Rx; CSA Code #-2100; Form 236.

$C_{11}H_{16}N_2O_3$

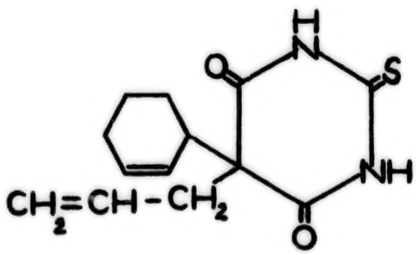
Molecular weight - 224.25



29. 5-ALLYL-5(2-CYCLOHEXEN-1-YL)-2-THIOBARBITURIC ACID
Thialbarbital; Schedule III; oral Rx; CSA Code #-2100; Form 236.

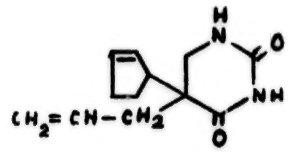
$C_{13}H_{15}NaO_2S$

Molecular weight - 200.26



30. 5-ALLYL-5-(2-CYCLOPENTEN-1-YL) BARBITURIC ACID
Barecal; Cyclopal; Cyclopen; Dormisan; Hypalen; Schedule III; oral Rx; CSA Code #-2100; Form 236.

$C_{12}H_{14}N_2O_3$

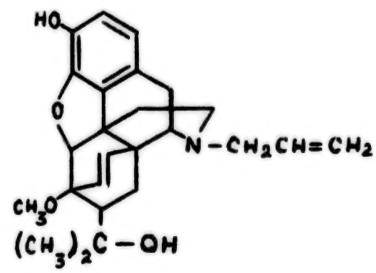


Molecular weight - 234.25

Na Salt - Percentage of anhydrous base - 91.08

31. N-ALLYL-6, 14-ENDOETHENO-7-(2-HYDROXY-2-PROPYL) TETRAHYDRONORORIPAVINE
M-159; Schedule I; No CSA Code assigned; Import/Export permits required.

$C_{25}H_{31}NO_4$

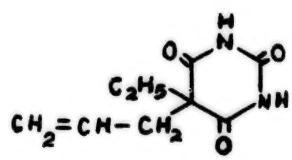


Molecular weight - 409.51

HCL - Percentage of anhydrous base - 91.6

32. 5-ALLYL-5-ETHYLBARBITURIC ACID
Ethallobarbital; Aethallymal; Dormin; Dorval; Schedule III; oral Rx; CSA Code #-2100; Form 236.

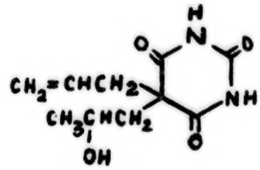
$C_9H_{12}N_2O_3$



Molecular weight - 196.06

33. 5-ALLYL-5-(2-HYDROXYPROPYL) BARBITURIC ACID
Barbituric acid; Centralgyl; Schedule III; oral Rx; CSA Code #-2100; Form 236.

$C_{10}H_{14}N_2O_4$



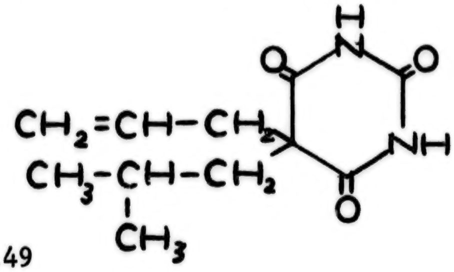
Molecular weight - 226.23

34. 5-ALLYL-5-ISOBUTYLBARBITURIC ACID
Allsobarbital; Allylbarbital; butalbital; itobarbital; Schedule III; oral Rx; CSA Code #-2100; Form 236. See Florinal; Paradol; Sandoptal and Tenstan.

$C_{11}H_{16}N_2O_3$

Molecular weight - 224.25

Na - Percentage of anhydrous base 85.49

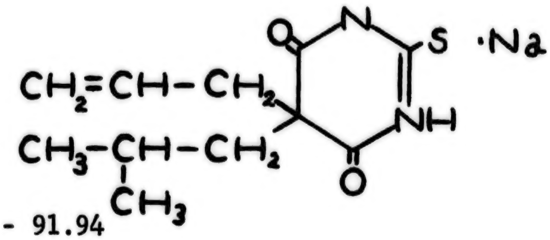


35. 5-ALLYL-5-ISOBUTYL-2-THIOBARBITURIC ACID
Buthalital; Thialbutal; Thialisobumal; Schedule III; oral Rx; CSA Code #-2100; Form 236.

$C_{11}H_{15}N_2NaO_2S$

Molecular weight - 262.31

Na Salt - Percentage of anhydrous base - 91.94

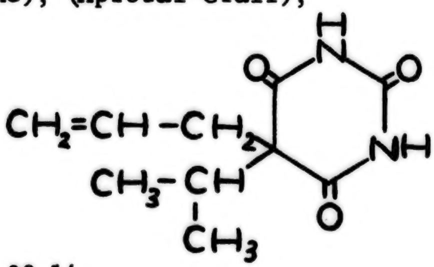


36. 5-ALLYL-5-ISOPROPYLBARBITURIC ACID
Allopropylbarbital; aprobarbital; Schedule III; oral Rx; CSA Code #-2100; Form 236. See (Alurate-Roche); (Aprotal-Grail); (Spasmanol-Tilden-Yates).

$C_{10}H_{14}N_2O_3$

Molecular weight - 210.23

Na Salt - Percentage of anhydrous base - 90.14

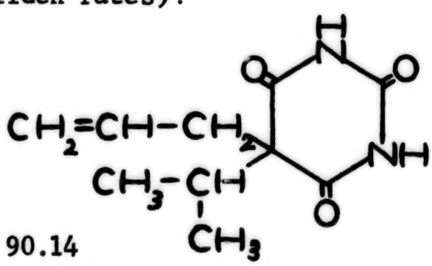


37. ALLYLISOPROPYLMALONYLUREA
Allopropylbarbital; aprobarbital; 5-allyl-5-isopropylbarbituric acid; Schedule III; oral Rx; CSA Code #-2100; Form 236. See (Alurate-Roche); (Aprotal-Grail) and (Spasmanol-Tilden Yates).

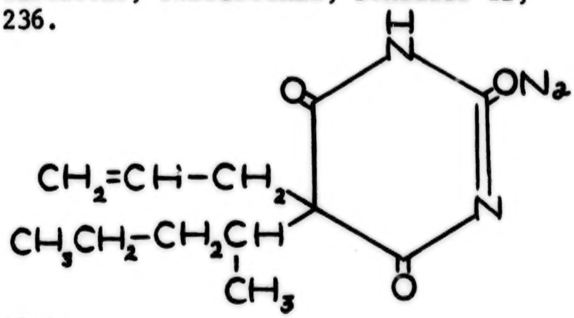
$C_{10}H_{14}N_2O_3$

Molecular weight - 210.23

Na Salt - Percentage of anhydrous base - 90.14



38. 5-ALLYL-5-(1-METHYLBUTYL)-2-BARBITURIC ACID
Barbituric acid-Sodium salt-Secobarbital Sodium, Seconal Sodium-Lilly's brand of Secobarbital Sodium; Synonyms: Isozol, Saurital; Surital; Thiamylal; Thioquinal barbitone; Thioseconal; Schedule II; CSA Code #-2315; oral Rx; Form 236.



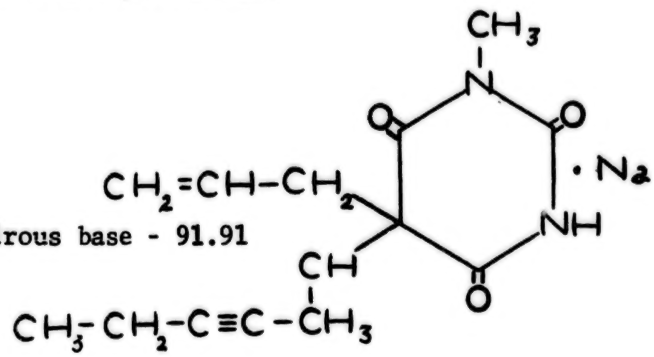
$C_{12}H_{17}O_2N_2$

Molecular weight - 237.28

Na Salt - $C_{12}H_{17}O_2Na$

Percentage of anhydrous base - 91.19

39. 5-ALLYL-1-METHYL-5-(1-METHYL-2-PENTYNYL) BARBITURIC ACID SODIUM SALT
Methohexital (Sodium Salt). A barbituric acid derivative; Brevital; Schedule IV; oral Rx; CSA Code #-2264; Form 236.

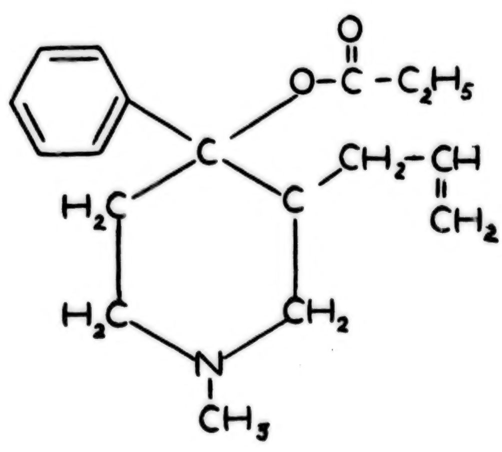


$C_{14}H_{17}N_2NaO_3$

Molecular weight - 284.30

Na Salt - Percentage of anhydrous base - 91.91

40. 3-ALLYL-1-METHYL-4-PHENYL-4-PROPIONOXYPIPERIDINE
Allylprodine; Alperidine; N.I.H.-7440; Ro-2-7113; Schedule I; CSA Code #-9602; Import/Export permits required.



$C_{18}H_{25}NO_2$

Molecular weight - 287.41

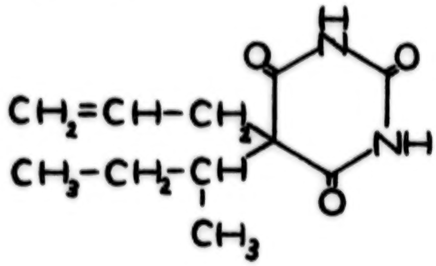
HCL - Percentage of anhydrous base - 88.70

41. 5-ALLYL-5-(1-METHYLPROPYL)BARBITURIC ACID
5-allyl-5-sec-butylbarbituric acid; Lotusate; Profundol; Talbutal; Schedule III; oral Rx; CSA Code #-2100; Form 236.

$C_{11}H_{16}N_2O_3$

Molecular weight - 224.25

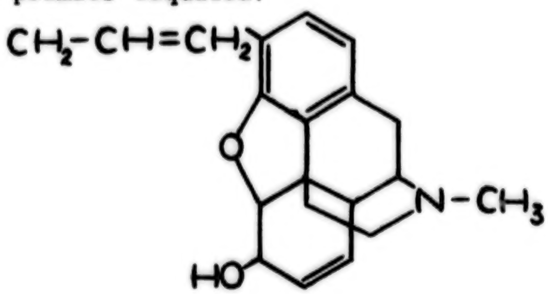
Percentage of anhydrous base - 100



42. ALLYLMORPHINE
The allyl ether of morphine; Enormorphine; Schedule I; Research only; No CSA Code assigned; Import/Export permits required.

$C_{20}H_{23}NO_2$

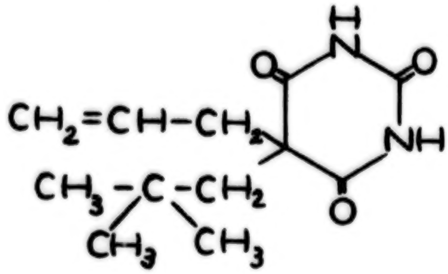
Molecular weight - 309.00



43. 5-ALLYL-5-NEOPENTYLBARBITURIC ACID
Neolbarbital; Nealbarbitone; Schedule III; oral Rx; CSA Code #-2100; Form 236.

$C_{12}H_{18}N_2O_3$

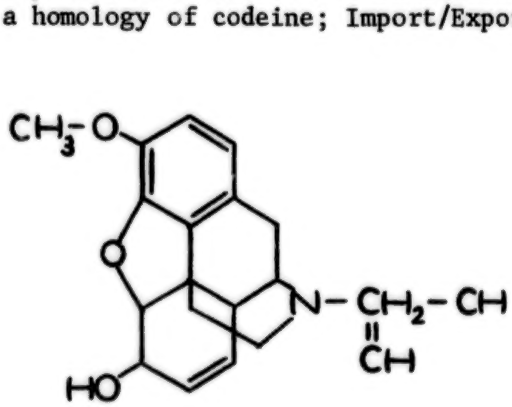
Molecular weight - 238.28



44. N-ALLYLNORCODEINE
Schedule I; obtained by the demethylation of codeine and substitution of an allyl group on the nitrogen; a homology of codeine; Import/Export permits required.

$C_{20}H_{22}NO_3$

Molecular weight - 326.30

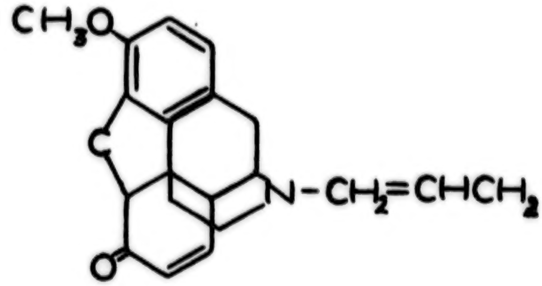


45. N-ALLYLNORCODEINONE

Schedule I; Research only; No CSA Code assigned; Import/Export permits required.

$C_{20}H_{22}NO_3$

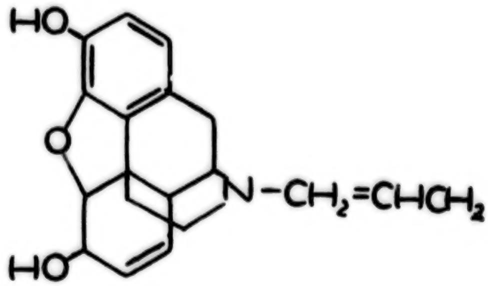
Molecular weight - 352.39



46. N-ALLYLNORMORPHINE

Allorphine; antorphine; lehridrome; nalline-Merck; nalorphine; Schedule III; CSA Code #-9400; Import/Export permits required. A morphine derivative possessing slight analgesic properties; however, used as an antogonist in morphine or heroin poisoning; not subject to international controls.

$C_{19}H_{21}NO_3$



Molecular weight - 311.37

HCL Salt - $C_{19}H_{21}NO_3 \cdot HCL$

Percentage of anhydrous base - 89.52

HBr - $C_{19}H_2NO_3 \cdot HBr$

Percentage of anhydrous base - 79.59

47. 5-ALLYL-5-PHENYLBARBITURIC ACID

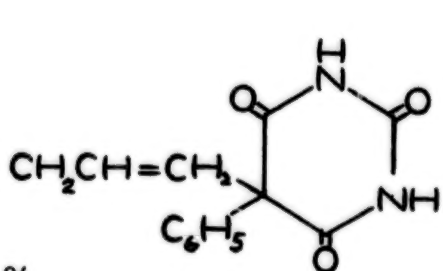
5-phenyl-5-allylbarbituric acid; alphenal; alphenate; Schedule III; oral Rx; CSA Code #-2100; Form 236.

$C_{13}H_{12}N_2O_3$

Molecular weight - 244.24

Na Salt - $C_{13}H_{11}N_2NaO_3$

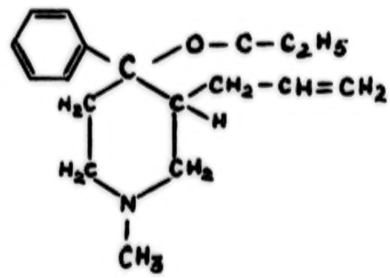
Percentage of anhydrous base - 96.04



48. ALLYPRODINE

Alperidine; N.I.H.-7440; Ro-2-7113; 3-allyl-1-methyl-4-phenyl-4-propionoxypiperidine; Schedule I; CSA Code #-9602; Import/Export permits required.

$C_{18}H_{25}NO_2$



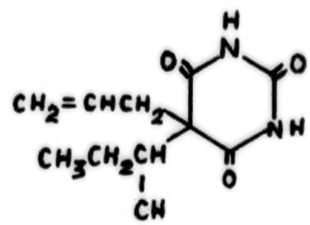
Molecular weight - 287.42

Percentage of anhydrous base - 88.70

49. 5-ALLYL-5-SEC-BUTYLBARBITURIC ACID

5-allyl-5-(1-methylpropyl) barbituric acid; Lotusate; Profundol; Talbutal; Schedule III; oral Rx; CSA Code #-2100; Form 236.

$C_{11}H_{16}N_2O_3$



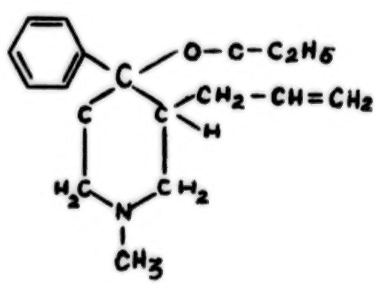
Molecular weight - 224.25

Percentage of anhydrous base - 100

50. ALPERIDINE

Allylprodine; 3-allyl-1-methyl-4-phenyl-4-propionoxypiperidine; N.I.H.-7440; Ro-2 7113; Schedule I; CSA Code #-9602; Import/Export permits required.

$C_{18}H_{25}NO_2$

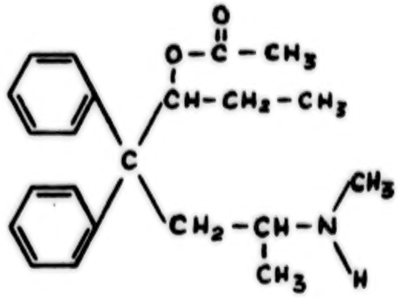


Molecular weight - 287.41

HCL Salt - $C_{18}H_{25}NO_2 \cdot HCL$

Percentage of anhydrous base - 88.70

51. ALPHA-dl-3-ACETOXY-6-METHYL-AMONO-4, 4-DIPHENYL HEPTANE
Noracymethadol; a methadone derivative; Schedule I; CSA Code #-9633; Import/Export permits required.

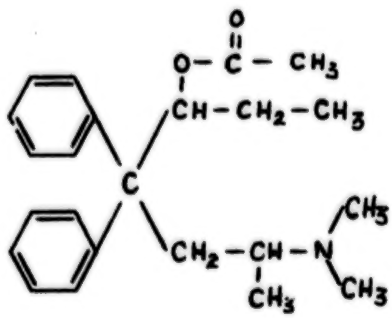


$C_{22}H_{29}NO_2$

Molecular weight - 339.48

HCL - Percentage of anhydrous base - 90.31

52. ALPHACETYLMETHADOL 1/
Derived from methadone by reduction; Schedule I; CSA Code #-9603; Import/Export permits required. Currently being evaluated as a possible replacement for methadone in "maintenance" therapy. A-4, 4-diphenyl-6-dimethylamino-3-acetoxyheptane; a 6-dimethylamine-4, 4-diphenyl-3-acetoxyheptane; LAM; Methadyl Acetate; Acemethadone; Amidolacetate. Its precursors are (a), 4-dimethylamino-2, 2-diphenvaleronitrile, (amino nitrile), ($C_{19}H_{22}N_2$); (b), d-methadone, (d-tartaric acid) $C_{24}H_{33}NO_6$ and (c), ℓ-α-methadol (the ethyl magnesium bromide salt); $C_{23}H_{34}NO \cdot MgBr$.



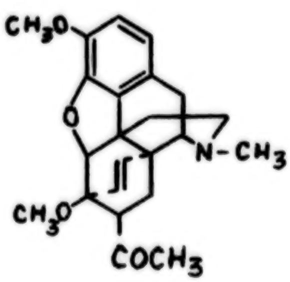
$C_{23}H_{31}NO_2$

Molecular weight - 353.49

HCL - Percentage of anhydrous base - 90.65

HBR - Percentage of anhydrous base - 81.37

53. 7-ALPHA-ACETYL-6,7,8,14-TETRAHYDRO-6, 14-ENDO ETHENOTHEBAINE
M-39; a thebaine derivative; oripavine group; Schedule I; No CSA Code assigned; Import/Export permits required.



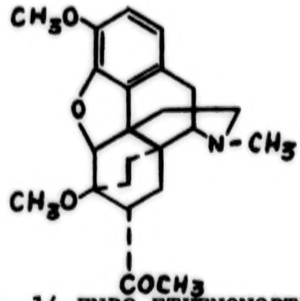
$C_{23}H_{27}NO_4$

Molecular weight - 381.46

HCL - Percentage of anhydrous base - 91.2

1/ Corrigendum - Spelled "Alphacetylmathadol" in the Law.

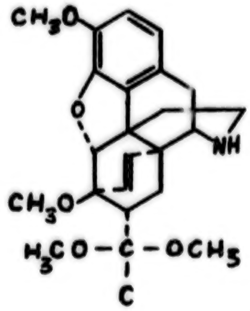
54. 7-ALPHA-ACETYL 6,7,8,14-TETRAHYDRO-6, 14 ENDO ETHENO THEBAINE
M-5028; derived from M-39; a thebaine derivative; Schedule I; CSA Code #-9059; Import/Export permits required.



$C_{23}H_{27}NO_4$

Molecular weight - 381.46

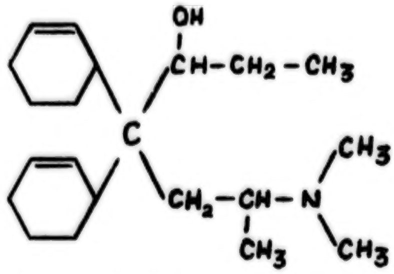
55. 7-ALPHA-(1,1-DIMETHOXYETHYL)-6,7,8,14-TETRAHYDRO-6, 14-ENDO ETHENONORTHEBAINE
CL110,035, (Lederle); a thebaine derivative; Schedule I; Research only; Import/Export permits required.



$C_{24}H_{31}NO_5$

Molecular weight - 413.50

56. ALPHA-6-DIMETHYL AMINO-4, 4-DIPHENYL-3-HEPTANOL
Alphamethadol; a methadone derivative; Schedule I; CSA Code #-9605; Research only; Import/Export permits required.

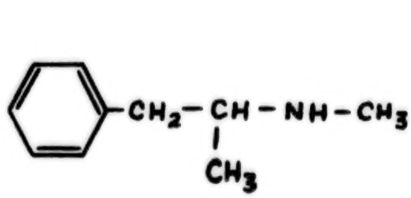


$C_{21}H_{29}NO$

Molecular weight - 311.45

57. ALPHA-DIMETHYLPHENETHYLAMINE, (+)-N
Methamphetamine; desoxyephedrine; a phenethylamine derivative; Schedule II; CSA Code #- injectables-1400, other Forms-1105; written Rx; Import/Export permits required.

$C_{10}H_{15}N$



Molecular weight - 149.237

Percentage of anhydrous bases:

HCL - 80.35

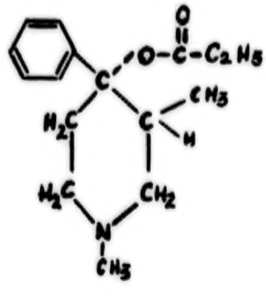
Pot. Saccharate - 41.51

SO_4 - 60.84

58. ALPHA-1,3-DIMETHYL-4-PHENYL-4-PROPIONOXYPIPERIDINE

Alphaprodine; dl-1,3-dimethyl-4-phenyl-4-piperidinol propionate. Nisentil-Roche's brand of alphaprodine hydrochloride. A synthetic pethidine derivative of rapid but short duration; ampoules; Schedule II; written Rx; CSA Code #-9010; Import/Export permits required.

$C_{16}H_{23}NO_2$



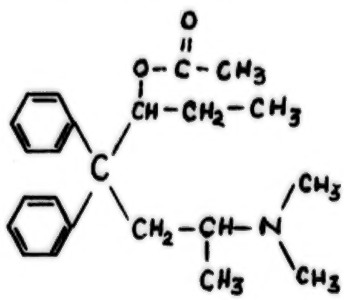
Molecular weight - 261.36

HCL - Percentage of anhydrous base - 87.75

59. ALPHA-4, 4-DIPHENYL-6-DIMETHYLAMINO-4, 4-DIPHENYL-3-ACETOXYHEPTANE

Alphacetylmethadol; Acemethadone; Amidolacetate; LAM; Schedule I; CSA Code #-9603; currently being evaluated as a possible replacement for methadone in "maintenance" therapy.

$C_{23}H_{31}NO_2$

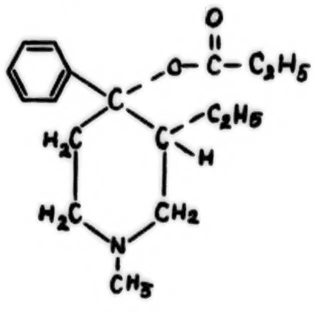


Molecular weight - 353.49

60. ALPHAMEPRODINE

Alpha-1-methyl-3-ethyl-4-phenyl-4-propionoxypiperidine; Nu-1932; Schedule I; CSA Code #-9604; Import/Export permits required.

$C_{17}H_{25}NO_2$

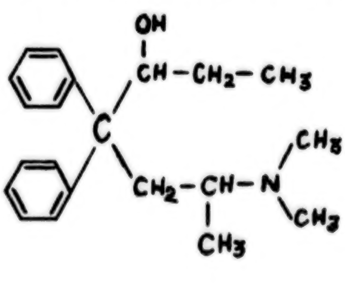


Molecular weight - 353.49

61. ALPHAMETHADOL

Alpha-6-dimethylamino-4, 4-diphenyl-3-heptanol. A methadone derivative; Schedule I; CSA Code #-9605; Research only; Import/Export permits required.

$C_{21}H_{29}NO$

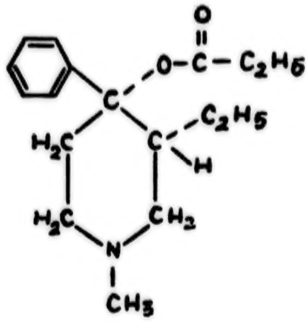


Molecular weight - 311.45

306-877 O - 79 - 3

62. ALPHA-1-METHYL-3-ETHYL-4-PHENYL-4-PROPIONOXYPIPERIDINE
Alphameprodine; Nu-1932; Schedule I; CSA Code #-9604; Import/Export permits required; Research only.

$C_{17}H_{25}NO_2$



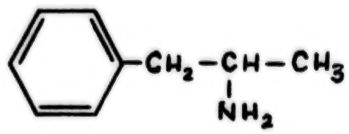
Molecular weight - 353.49

Percentage of anhydrous base - 100

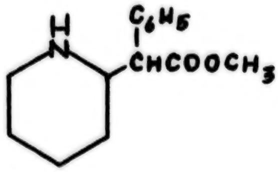
63. dl-ALPHA-METHYLPHENETHYLAMINE
(+)-2-Amino-1-phenylpropane; Amphetamine; Schedule II; written Rx; CSA Code #-1100; Import/Export permits required. See Amphetamine for percentage of anhydrous bases for the several salts.

$C_9H_{13}N$

Molecular weight - 135.20



64. ALPHA-PHENYL-2-PIPERIDINE
Acetic acid methyl ester; methylphenidate; methylphenidylacetate; Ritalin; Schedule II; written Rx; CSA Code #-1726; Import/Export permits required.



$C_{14}H_{19}O_2$

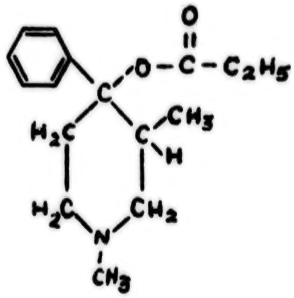
Molecular weight - 233.30

HCL - Percentage of anhydrous base - 86.50

65. **ALPHAPRODINE**

Alpha-1,3-dimethyl-4-phenyl-4-propionoxypiperidine; dl-1,3-dimethyl-4-phenyl-4-piperidinol propionate; Nisentil-Roche's brand of alphaprodine hydrochloride. A synthetic pethidine derivative of rapid but short duration; ampoules; Schedule II; written Rx; CSA Code #-9010; Import/Export permits required.

$C_{16}H_{23}NO_2$



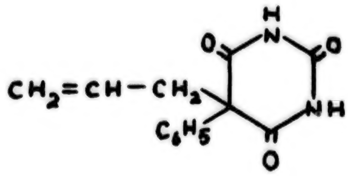
Molecular weight - 261.36

HCL - Percentage of anhydrous base - 87.75

66. **ALPHENAL**

5-allyl-5-phenylbarbituric acid; 5-phenyl-5-allylbarbituric acid; Alphenate; Schedule III; oral Rx; CSA Code #-2100; Form 236.

$C_{13}H_{12}N_2O_3$



Molecular weight - 244.24

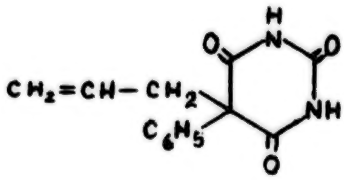
Na Salt - $C_{13}H_{11}N_2NaO_3$

Percentage of anhydrous base - 96.04

67. **ALPHENATE**

5-allyl-5-phenylbarbituric acid; 5-phenyl-5-allylbarbituric acid; Alphanal; Schedule III; oral Rx; CSA Code #-2100; Form 236.

$C_{13}H_{12}N_2O_3$



Molecular weight - 244.24

Na Salt - $C_{13}H_{11}N_2NaO_3$

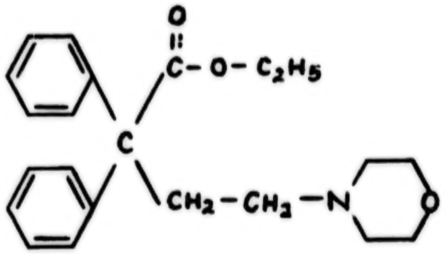
Percentage of anhydrous base - 96.04

68. AMIDALGON

Dioxaphetyl Butyrate; Spasmoxale; ethyl-2-diphenyl-4-morpholinobutyrate; a methadone derivative; Schedule I; CSA Code #-9621; Research only; Import/Export permits required.

$C_{22}H_{27}NO_3$

Molecular weight - 353.44

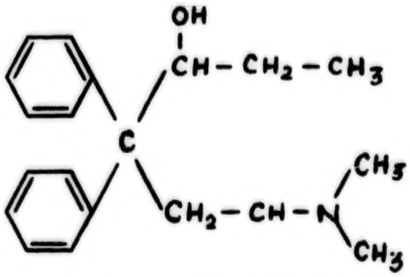


69. AMIDOL

Dimepheptanol; methadol; Pergerin; N.I.H.-2933; 4, 4-diphenyl-6-dimethylamino heptanol or 6-dimethylamino-4, 4-diphenyl-3-heptanol; Schedule I; CSA Code #-9618; Research only; Import/Export permits required.

$C_{21}H_{29}NO$

Molecular weight - 311.45

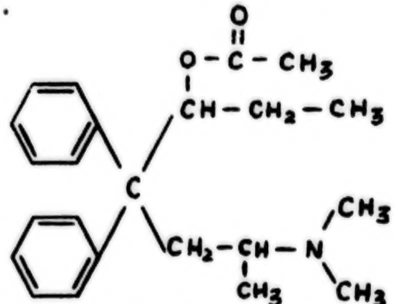


70. AMIDOLACETATE

Alphacetylmethadol; Acemethadone; Acemethadol; LAM; Alpha-4, 4-diphenyl-6-dimethylamino-4, 4-diphenyl-3-acetylxyheptane; Schedule I; CSA Code #-9603. Currently being evaluated as a possible replacement for methadone in "maintenance" therapy.

$C_{23}H_{31}NO_2$

Molecular weight - 353.49

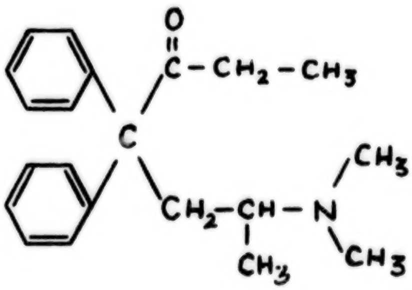


71. AMIDONE

Non proprietary name for methadone HCL; Schedule II; written Rx; CSA Code #-9250; Import/Export permits required.

$C_{21}H_{27}NO$

Molecular weight - 309.20

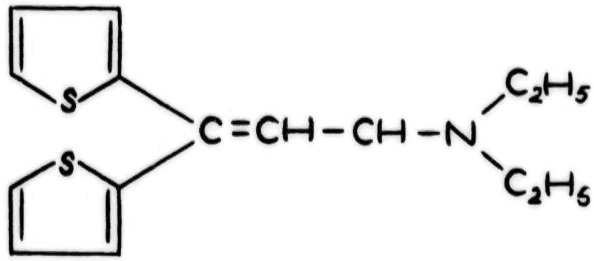


72. AMINOBUTENE

Dimethylthiambutene; Dimethibutin; N.I.H.4542; 3-dimethylamino-1, 1-di-(2-thienyl)-1-butene; Schedule I; CSA Code #-9619; Research only; Import/Export permits required.

$C_{16}H_{21}NS_2$

Molecular weight - 291.24

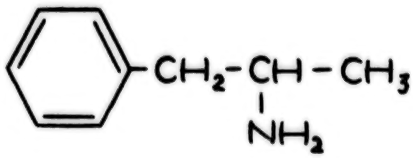


73. (+)-2-AMINO-1 PHENYLPROPANE

dl-Alpha-methylphenethylamine; Amphetamine; occurs in the usual three optical isomers and used in many preparations. Schedule II; written Rx; CSA Code #-1100; Import/Export permits required (See Amphetamine).

$C_9H_{13}N$

Molecular weight - 135.20

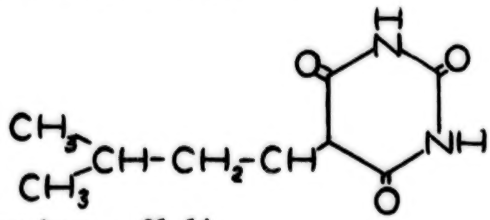


74. AMOBARBITAL

5-ethyl-5-isopentylbarbituric acid; used alone or in combination with other active ingredients. Many preparations currently available contain amobarbital. See Amytal Sodium-Lilly; Dexamyl-SKF; Amobarbital-(Caldwell-Bloor), (Lannett), (Lemmon) and (Linden). Alitinal, Altinal, Amargyl, Amesec, Amilbarbital, Amital, Amobarbital, Amobarbitone, Amphodex, Amybal, Amylobarbitone, Amylozine, Amytal, Barbamil, Co-Elorine, Dadexal, Daprisal, Dexamyl, Dexytal, Dorlotin, Dorminal, Dormistab, Dormytal, Drinamyl, Dusotal, Estasule, Isonal, Metromin, Neroxin, Pentymal Sedal, Tuinal, Veryl, Zamitol. Schedule II; written Rx; CSA Code #-2125; Import/Export permits required.

$C_{11}H_{18}N_2O_3$

Molecular weight - 226.27



Na Salt - Percentage of anhydrous base - 91.14

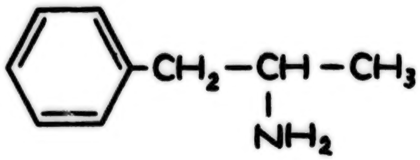
75. AMPHETAMINE

Schedule II; written Rx; CSA Code #-1100; Import/Export permits required. Chemically, the amphetamines are classified as alkylamines and medically as being sympathomimetic in their action. The generic name "Amphetamine" is derived from its chemical name (alpha-methyl-phenethyl-amine). It occurs in the usual three optical isomers; i.e., the dextro, levo and the racemic mixture. The dextro form is the dextro rotatory component of the dl form. Both forms are usually marketed as the sulfate salt. The racemic mixture is also available as the phosphate salt. Amphetamine is generally considered to be a demethylated desoxyephedrine. There are over 25 different compounds exhibiting sympathomimetic action which are considered to be chemical cousins to Amphetamine. Some of these related compounds such as azacyclonal are not covered under C.S.A.

$C_9H_{13}N$; dl-Alpha-methylphenethylamine; 1-phenyl-2-amino propane.

Molecular weight - 135.20

Salt	Percentage of anhydrous base
Adipate	48.06
Aspartate	50.39
Hydrochloride	78.78
Phosphate-monobasic	57.97
Phosphate-Dibasic	73.39
Resinate	39.00
Saccharate	39.15
Succinate	53.39
Sulfate, monobasic	57.93
Sulfate, dibasic	73.39
Tartrate	47.40



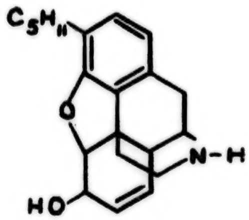
Ethyl Ether	Solvent	Methanol	Solvent
Formamide	Essential Chemical	Palladium Black	Catalyst
Hydroxyl Amine	Essential Chemical	Potassium Hydroxide	Reagent
Hydrogen	Catalyst	Sodium Acetate	Reagent
Lithium Aluminum Hydride	Reagent	Sulfuric Acid	Reagent

Penylacetone (phenyl 2-Propanone) .... Raw Material

76. AMYLNORMORPHINE

Schedule I; Research only; No CSA Code assigned; Import/Export permits required.

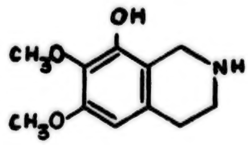
$C_{21}H_{27}NO_3$



Molecular weight - 341.43

77. ANHALAMINE

Derived from the Peyote plant; 6,7-Dimethoxy-8-hydroxy-1,2,3,4-tetrahydroixoquinoline; Schedule I; CSA Code #-7416; Import/Export permits required.

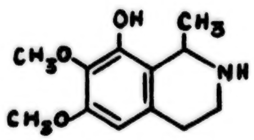


$C_{11}H_{15}NO_3$

Molecular weight - 209.24

78. ANHALONIDINE

Derived from the Peyote plant; 7,8-dimethoxy-8-hydroxy-1-methyl-1, 2,3,4-tetrahydroisoquinoline; 1,2,3,4-tetrahydro-6,7-dimethoxy-1-methyl 8-isoquinolinol; Schedule I; CSA Code #-7417; Import/Export permits required.

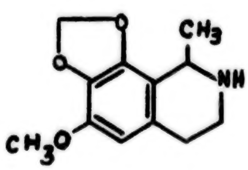


$C_{12}H_{17}NO_3$

Molecular weight - 223.24

79. ANHALONINE

Derived from the Peyote plant; 8-methoxy-6,7-methylenidoxy-1-methyltetrahydroisoquinoline; Schedule I; CSA Code #-7419; Import/Export permits required.



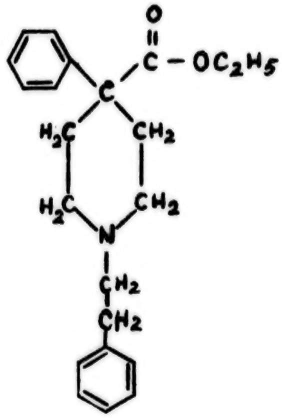
$C_{12}H_{15}NO_3$

Molecular weight - 221.25

80. ANILERIDINE

Merck's brand of Leritine; Lerinol; ethyl-1- (2-p-aminophenyl)-ethyl -4-phenylpiperidine-4-carboxylate; Schedule II; written Rx; **CSA** Code #-9020; Import/Export permits required.

$C_{22}H_{28}N_2O_2$



Molecular weight - 352.38

Percentage of anhydrous base

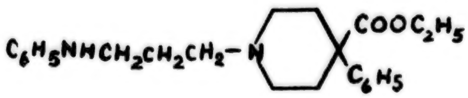
Di-HCL - 82.85

Phosphate - 78.25

81. ANOPRIDINE

Piminodine; Ethyl, 4-phenyl-1- 3-(phenylamino)-propyl -4, piperidinecarboxylate; Schedule II; **CSA** Code #-9730; Import/Export permits required; written Rx.

$C_{23}H_{30}N_2O_2$

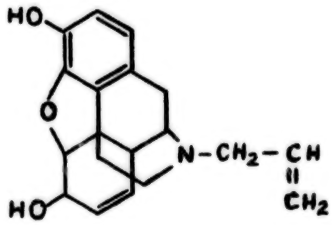


Molecular weight - 366.486

82. ANTORPHINE

N-Allylmorphine; Allorphine; Lehridrome; Nalline-Merck; Nalorphine; Schedule III; **CSA Code** #-9400; Import/Export permits required; a morphine derivative possessing slight analgesic properties; however, used as an antagonist in morphine or heroin poisoning. Not subject to international controls.

$C_{19}H_{21}NO_3$



Molecular weight - 311.37

HCL Salt - $C_{19}H_{21}NO_3 \cdot HCL$

Percentage of anhydrous base - 89.52

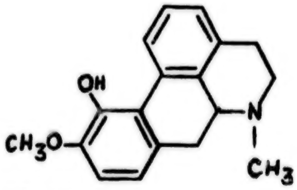
HBR Salt - $C_{19}N_{21}NO_3 \cdot HBR$

Percentage of anhydrous base - 79.59

83. APOCODEINE

A monomethyl ether of apomorphine; Schedule I; Research only; No **CSA** Code assigned; Import/Export permits required.

$C_{18}H_{19}NO_2$



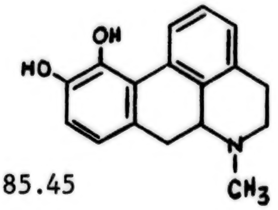
Molecular weight - 281.34

HCL - Percentage of anhydrous base - 88.53

84. APOMORPHINE

A potent emetic derived from morphine by the extraction of one molecule of water. Possesses no additive liabilities and is not subject to internationsl control. Schedule II; written Rx; **CSA** Code #-9030; Import/Export permits required.

$C_{17}H_{17}NO_{21}$



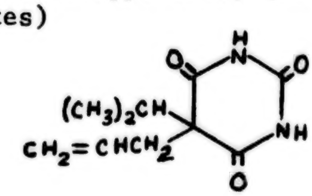
Molecular weight - 267.31

HCL - Percentage of anhydrous base - 85.45

85. APROBARBITAL

5-Allyl-5-isopropyl-barbital; Allopropylbarbital; Schedule III; **CSA** Cdoe #-2100; Form 236. See (Alubarbi-Approved); (Alurate-Roche); (Aprota;-Grail) and (Spasmanol-Tilden Yates)

$C_{10}H_{14}N_2O_3$



Molecular weight - 210.23

Na Salt - Percentage of anhydrous base - 90.14

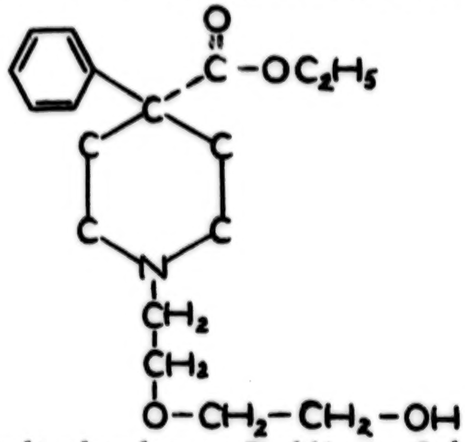
B

86. ATENORAX

Etoxeridine; Atenos; Carbetidine; a pethidine derivative; 1- 2-(2-hydroxy-ethoxy)-ethyl -4-phenylpiperidine-4-carboxylic acid ethyl ester; Schedule I; CSA Code #-9625; Research only; Import/Export permits required.

$C_{18}H_{27}NO_4$

Molecular weight - 321.40



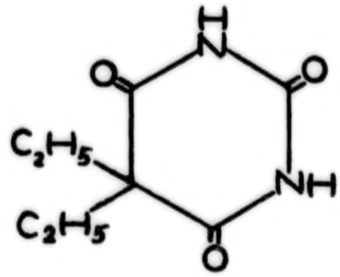
1. BARBITAL

5, 5-Diethylbarbituric acid; Diethylamalonylurea; Barbitone; Codeonal; Dicumal; Dormonal; Embinal; Malonal; Veronal; Schedule IV; oral Rx; CSA Code #-2145.

$C_8H_{12}N_2O_3$

Molecular weight - 184.19

Na Salt - Percentage of anhydrous base - 88.94

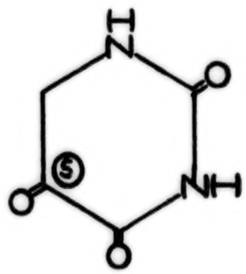


2. BARBITURIC ACID DERIVATIVE

Malonylurea; 2,4,6-trioxohexahydro pyrimidine or its enol forms. Also includes the buta, cyclo, hexa, penta, seco, etc. The Law covers any derivative or salt of a derivative. While numerous theoretical derivatives are possible, only those compounds that are doubly substituted at the No. 5 position are considered active.

$C_4H_4N_2O_3$

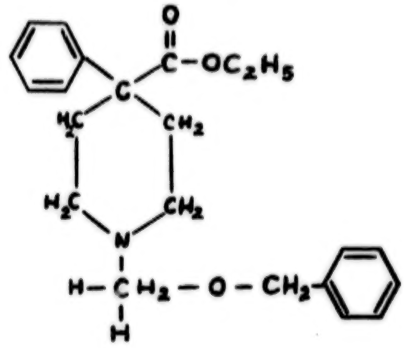
Molecular weight - 128.09



3. BENZETHIDINE

Benzyloxyethylnorpethidine ethyl 1-(2-benzyloxyethyl)-4-phenyl-4-piperidine carboxylate N.I.H.-7574; HO-9585; TA-28; Schedule I; a pethidine derivative; CSA Code #-9606; Import/Export permits required.

$C_{23}H_{29}NO_2$



Molecular weight - 367.40

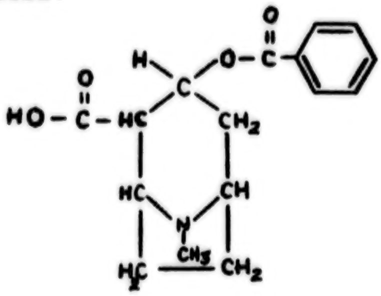
HBR - Percentage of anhydrous base - 82.14

HCL - Percentage of anhydrous base - 90.94

4. BENZOYLECGONINE

Ecgonine benzoylester; Schedule II; without medical utility; CSA Code #-9187; Import/Export permits required.

$C_{16}H_{19}NO_4 \cdot 4H_2O$

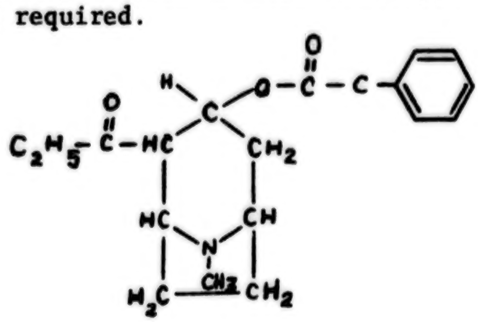


Molecular weight - 361.39

5. BENZOYLECGONINE ETHYLESTER

Ecgonine benzoylethylester; Schedule II; without medical utility; CSA Code #-9181; Import/Export permits required.

$C_{18}H_{23}NO_4$

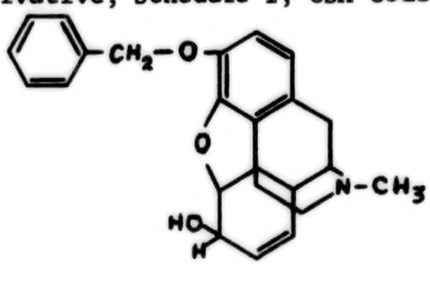


Molecular weight - 317.37

6. BENZYLMORPHINE

3-benzylmorphine; a morphine derivative; Schedule I; CSA Code #-9052; Import/Export permits required.

$C_{24}H_{25}NO_3$



Molecular weight - 375.45

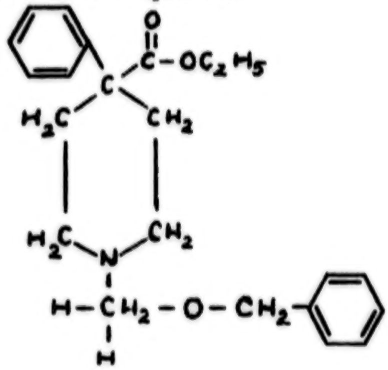
7. BENZYLOXYETHYL NORPETHIDINE
Benzethidine; Ethyl 1-(2-benzyloxyethyl)-4-phenyl-4-piperidine carboxylate; N. I. H.-7574; H.O.-9585; TA-28; Schedule I; a pethidine derivative; CSA Code #-9606; Import/Export permits required.

$C_{23}H_{29}NO_2$

Molecular weight - 367.40

HBR - Percentage of anhydrous base - 82.14

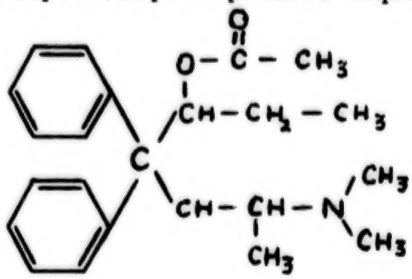
HCL - Percentage of anhydrous base - 90.94



8. BETACETYLMETHADOL
B-6-dimethylamino-4, 4-diphenyl-3-acetoxy-heptane; a methadone derivative; Schedule I; CSA Code #-9607; Import/Export permits required.

$C_{23}H_{31}NO_2$

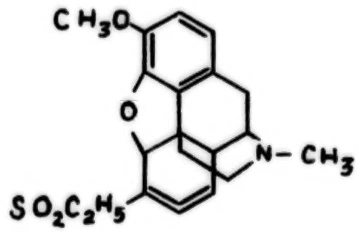
Molecular weight - 353.49



9. BETA-ETHYLSULFONYLCODIDE
Schedule I; No CSA Code assigned; Import/Export permits required.

$C_{20}H_{25}NO_4S$

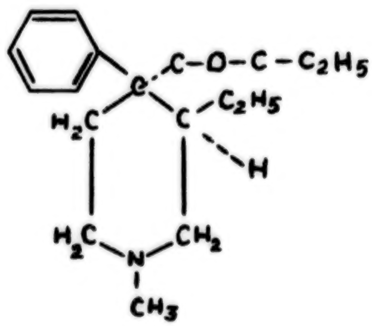
Molecular weight - 375.06



10. BETAMEPRODINE
Nu-1932; B-4, 4-diphenyl-4-propionoxypiperidine; a pethidine derivative; Schedule I; CSA Code #-9608; Import/Export permits required.

$C_{17}H_{25}NO_2$

Molecular weight - 375.38

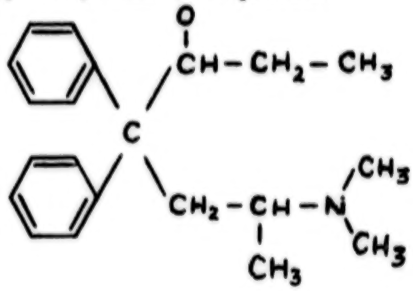


11. BETAMETHADOL

Betametadol; B-4, 4-diphenyl-6-dimethylamino-3-heptanol; B-6-dimethylamino-4, 4-diphenyl-3-heptanol; a methadone derivative; Schedule I; CSA Code #-9609; Import/Export permits required.

$C_{21}H_{29}NO$

Molecular weight - 311.45

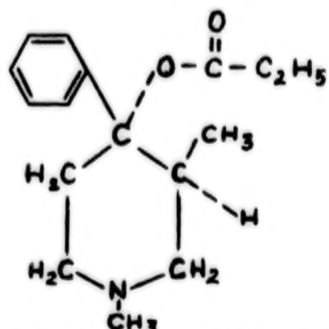


12. BETAPRODINE

Nu-1779; B-1,3-dimethyl-4-phenyl-4-propionoxypiperidine; a pethidine derivative; Schedule I; CSA Code #-9611; Import/Export permits required.

$C_{16}H_{23}NO_2$

Molecular weight - 261.36

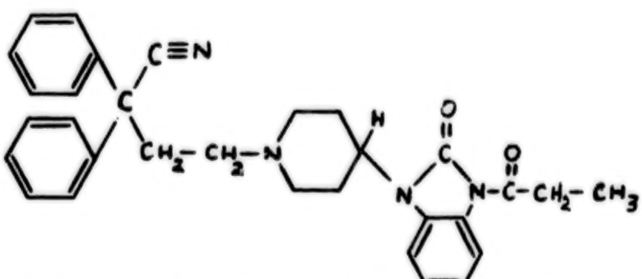


13. BEZITRAMIDE

R-4845; 1-(3-cyamo-3, 3-diphenyl-propyl)-4-(2-oxo-3-propionyl-1-benzimidazolinyl)-piperidine; a methadone derivative; Schedule I; CSA Code #-9800; Import/Export permits required.

$C_{31}H_{32}N_4O_2$

Molecular weight - 386.87

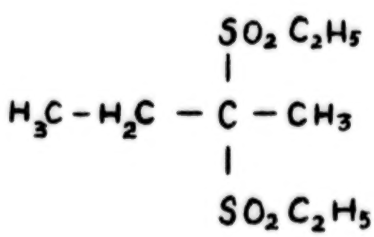


14. 2,2-BIS(ETHYLSULFONYLBUTANE)

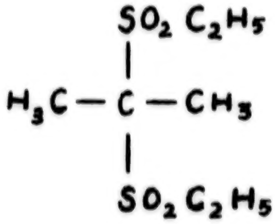
Sulfonethylmethane; methylsulfonal; trional; ethylsulfonyl. The ethyl analogue of sulfonmethane; Schedule III; oral Rx; CSA Code #-2605; Form 236.

$C_{18}H_{18}O_4S_2$

Molecular weight - 242.36



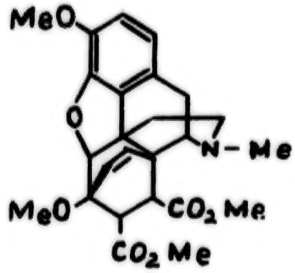
15. 2,2-BIS(ETHYLSULFONYLPROPANE):
Sulfonmethane; Sulfonal; propane diethylsulfone; Schedule III; oral Rx; CSA Code #-2610; Form 236.



$C_7H_{16}O_4S_2$

Molecular weight - 228.33

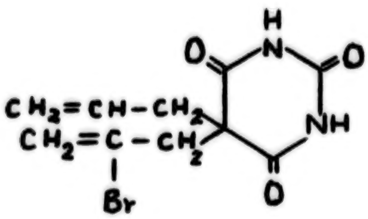
16. 17,18-BIS(METHOXYCARBONYL)-6,14-ETHENOCODEINE METHYL ETHER
MP-1048; Schedule I; No CSA Code assigned; Import/Export permits required.



$C_{25}H_{27}NO_7$

Molecular weight - 453.48

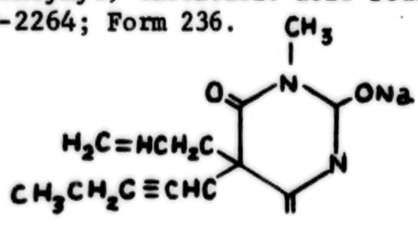
17. BRALLOBARBITAL
5-allyl-5-(2-Bromoallyl)-barbituric acid); Schedule III; oral Rx; CSA Code #-1100; Form 236.



$C_{10}H_{11}BrN_2O_3$

Molecular weight - 287.14

18. BREVITAL
A European trade name for Methohexital; a barbituric acid derivative; 5-allyl-1-methyl-5-(1-methyl-2-pentynyl) barbituric acid sodium salt; Schedule IV; oral Rx; CSA Code #-2264; Form 236.



$C_{14}H_{17}N_2NaO_3$

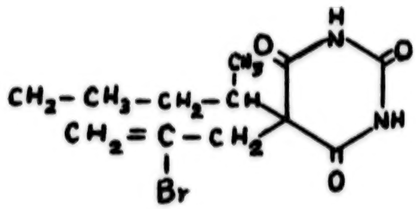
Molecular weight - 284.30

Na Salt - Percentage of anhydrous base - 91.91

19. 5-(BROMOALLYL)-5-(1-METHYLBUTYL) BARBITURIC ACID
R-239; Rectidon; Recton; Sigmodal; Schedule III; oral Rx; CSA Code #-2100; Form 236.

$C_{12}H_{17}BrN_2O_3$

Molecular weight - 317.20

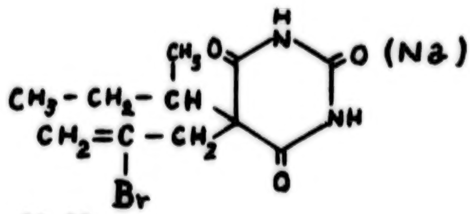


20. 5-(2-BROMOALLYL)-5-SEC-BUTYLBARBITURIC ACID
Butallylonal; Doralgin; Permocton; pexnoctone; pronarcon; Schedule III; oral Rx; CSA Code #-2100; Form 236.

$C_{11}H_{15}BrN_2O_3$

Molecular weight - 303.16

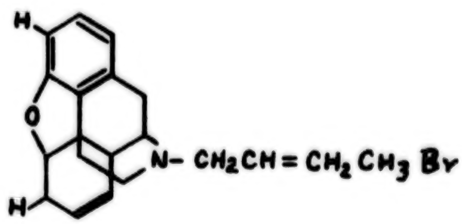
Na Salt - Percentage of anhydrous base - 92.95



21. N-(BROMOALLYL)-NORMORPHINE
An N-substituted derivative of normorphine; Schedule I; No CSA Code assigned; Import/Export permits required.

$C_{20}H_{24}NO_3Br$

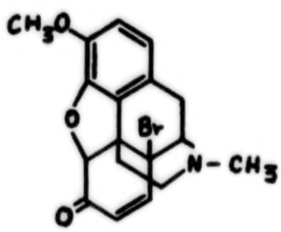
Molecular weight - 306.29



22. 14-BROMOCODEINONE
Schedule I; No CSA Code assigned; Import/Export permits required.

$C_{18}H_{21}NO_3 \cdot Br$

Molecular weight - 401.23

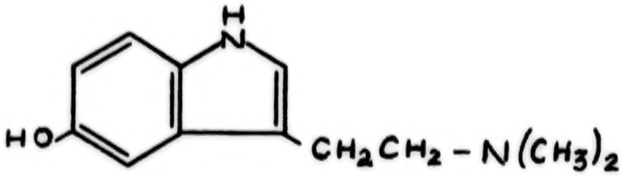


23. BUFOTENINE

3- [2-Dimethylamino ethyl] indol-S-ol; N, N-dimethylscrotonin-5-hydroxy-N-dimethyltryptamine; an indole derivative; hallucinogenic substance; Schedule I; CSA Code #-7433; Import/Export permits required.

$C_{12}H_{16}N_2O$

Molecular weight - 204.26



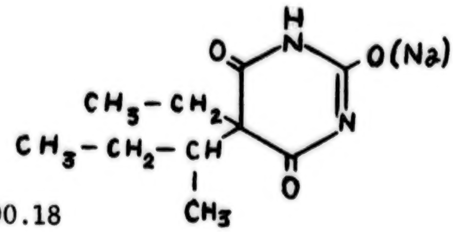
24. BUTABARBITAL

5-sec-butyl-5-ethylbarbituric acid; Bontril, Butacap; Butibel; Butisol; Ethobral; Fiorinal; Nidar; Noctinal; Schedule III; oral Rx; CSA Code #-2100; Form 236.

$C_{10}H_{15}N_2O_3$

Molecular weight - 234.23

Na - Percentage of anhydrous base - 90.18



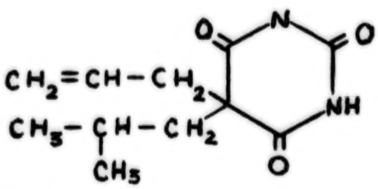
25. BUTALBITAL

Alisobumal; allylbarbital; itobarbital; 5-allyl-5-sec-butylbarbituric acid; 5-allyl-5-isobutylbarbituric acid; Schedule III; CSA Code #-2100; Form 236. See Abar-APC; Fiorinal; Paradol; Sandoptal and Tenstan.

$C_{11}H_{16}N_2O_3$

Molecular weight - 224.25

Na Salt - Percentage of anhydrous base - 85.49



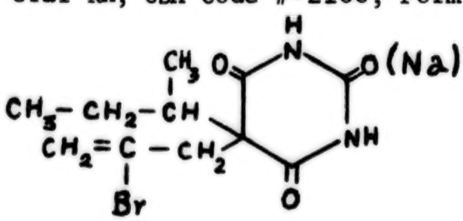
26. BUTALLYLONAL

5-(2-bromoallyl)-5-sec-butylbarbituric acid; Doralgin; Pernocton; Pernoctone; Pronarcon; Schedule III; oral Rx; CSA Code #-2100; Form 236.

$C_{11}H_{15}BrN_2O_3$

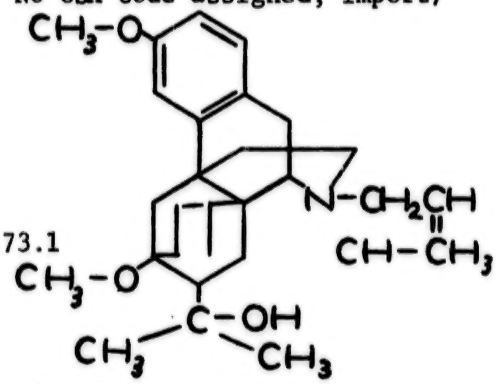
Molecular weight - 303.16

Na Salt - Percentage of anhydrous base - 92.95



27. N-(2-BUTENE-1-YL)-6, 14-ENDO-ETHENO-7-(2-HYDROXY-2-BUTYL)-TETRAHYDRONORTHEBAINE

M-247; a thebaine derivative; Schedule I; No CSA Code assigned; Import/Export permits required.



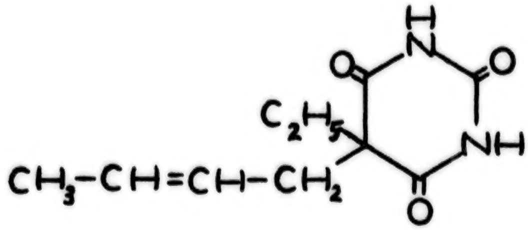
$C_{28}H_{37}NO_4$

Molecular weight - 451.59

Bitartrate - Percentage of anhydrous base - 73.1

28. 5-(2-BUTENYL)-5-ETHYLBARBITURIC ACID

Barotalum; Schedule III; oral Rx; CSA Code #-2100; Form 236.

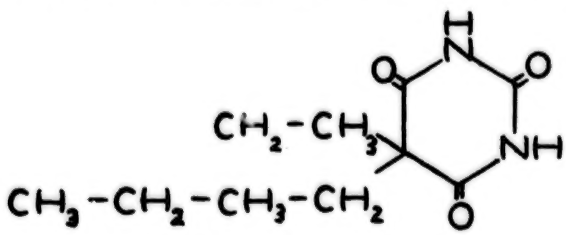


$C_{10}H_{14}O_3N_2$

Molecular weight - 210.08

29. BUTETHAL

5-Butyl-5-ethylbarbituric acid; Butenil; Butobarbital; Etoval; Neonal; Securonal; Sonergan; Tercin; Schedule III; oral Rx; CSA Code No. 2185; Form 236.



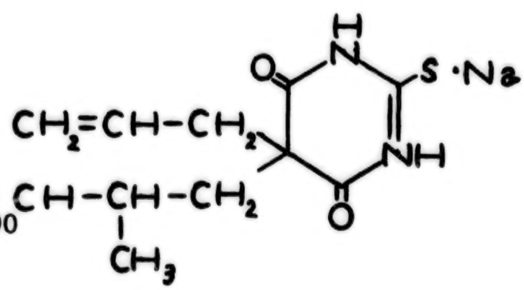
$C_{10}H_{16}N_2O_3$

Molecular weight - 212.24

Na - Percentage of anhydrous base - 90.24

30. BUTHALITAL SODIUM

5-allyl-5-isobutyl-2-thiobarbituric acid; Bayinal; Buthalital; Diurobese; Narcogen; Thialbutal; Thialisobumal; Ulbreval; Schedule III; oral Rx; CSA Code #-2110; Form 236.



$C_{11}H_{15}N_2O_2NaS$

Molecular weight - 262.31

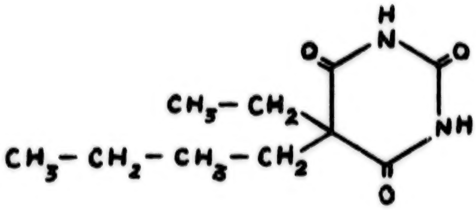
Percentage of anhydrous base - 84.90

306-877 0 - 79 - 4

31. BUTOBARBITAL
Butethal; 5-butyl-5-ethylbarbituric acid; Butenil; Etoval; Neonal; Securonal; Sonergan; Tercin; Schedule III; oral Rx; CSA Code #-2100; Form 236.

$C_{10}H_{16}N_2O_3$

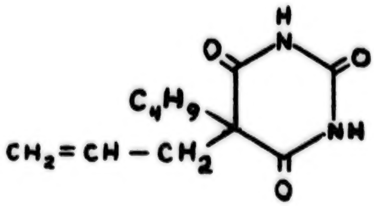
Molecular weight - 212.24



32. N-BUTYLALLYLBARBITURIC ACID
5-allyl-5-n-butylbarbituric acid; Dormupax; Idobutal; Schedule III; CSA Code #-2100; Form 236.

$C_{11}H_{16}N_2O_3$

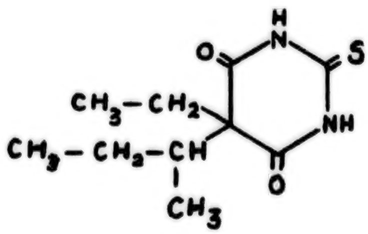
Molecular weight - 224.25



33. 5-SEC-BUTYL-5-ETHYL-2-THIOBARBITURIC ACID
5-ethyl-5-(1-methylpropyl)-2-thiobarbituric acid; Brevimarcon; Inactin; Inaktin; Narkothion; Schedule III; oral Rx; CSA Code #-2100; Form 236.

$C_{10}H_{16}N_2OS$

Molecular weight - 228.32



C

1. CANNABIS SATIVA

Schedule I; CSA Code #-7360; Import/Export permits required. See definition of "Marihuana" Title II, Section 102, (15) of the Controlled Substances Act of 1970; Public Law 91-513.

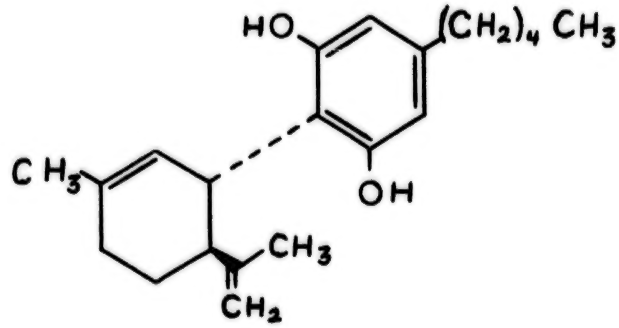
See Resume following.

2. CANNABIDIOL

2-p-MENTHA-5,8-dien-3-yl-5-pentyl resorcinol; a cannabis derivative; Schedule I; CSA Code #-7372; Import/Export permits required.

$C_{21}H_{30}O_2$

Molecular weight - 314.45

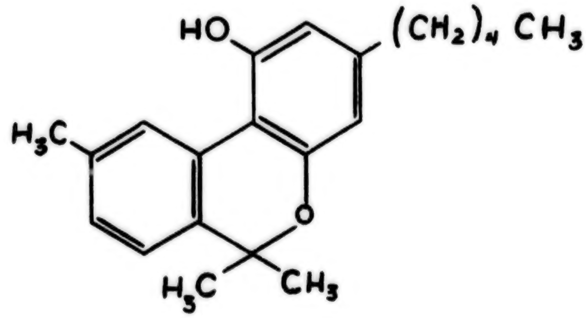


3. CANNABINOL

6,6,9-trimethyl-3-pentyl-6H-dibenzo [b,d] -pyran-1-ol; 3-amyl-1-hydroxy-6, 6,9-trimethyl-6H-dibenzo- [b,d] pyran; a cannabis derivative; Schedule I; CSA Code #-7373; Import/Export permits required.

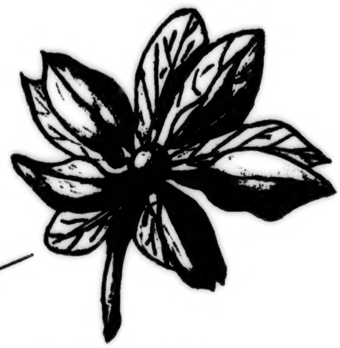
$C_{21}H_{26}O_2$

Molecular weight - 310.42

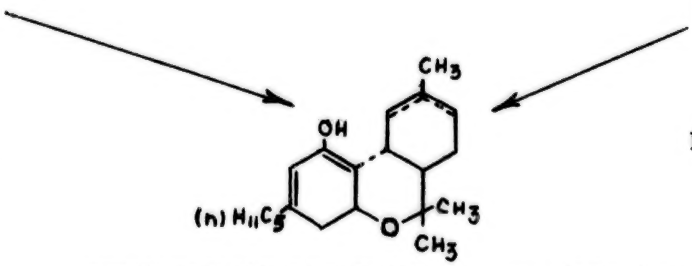


MARIHUANA LEAF

FEMALE FLOWER



MALE FLOWER



TETRAHYDROCANNIBINOL(S)-six possible isomers

PLATE NO. I

1. CANNABIS SATIVA

Cannabis sativa, L , from the genus, Cannabis and the family, Cannabinaceae is the bontanical name for a tall annual, woody, shrub having dioecious flowers and commonly known as marihuana. The term "marihuana" as defined in the Law means all parts of the plant, Cannabis sativa, L. (and any of its varieties); whether growing or not; the seeds thereof; the resin extracted from any part of such plant; and every compound, manufacture; salt, derivative; mixture, or preparation of such plant; its seeds or resins. Such terms do not include the mature stalks of such plants, fiber produced from such stalks, oils or cakes made from the seeds of such plants, any other compound, manufacture, salt derivative, mixture or preparation of such mature stalks (except the resin extracted there from), fiber, oil or cake or the sterilized seed of such plant which is incapable of germination. (See Section 102 (15), Pulbic Law (1-513).

The Cannabis plant contains several alkaloids; the principle ones being, Cannabinol, Cannabidiol and the Tetrahydrocannabinols. The tetrahydrocannabinols are the most active alkaloids and are considered to be the responsible agents for the hallucinogenic effects of marihuana. Cannabidiol, a diphenol, $C_{21}H_{28}$ (OH_2) and cannabinol, a phenol, $C_{21}H_{25}$ (OH) are physiologically inactive but serve as precursors in the biosynthesis of the tetrahydrocannabinols.

Hemp (Cannabis) is cultivated the world over. Its culture is presumed to have originated in China from whence it spread. It was cultivated for three purposes; namely, for the fiber, out of which rope, twine, cloth and hats are made; for the seed, from which a rapidly drying oil is obtained that is used in the arts, also as a commercial substitute for linseed oil and as a constituent of commercial bird seed mixture; thirdly, for the "narcotic" principle contained in the resin of the dried flowering tops of both stamenate and pistillate plants.

Hemp was grown in the New England colonies for fiber used in making homespun. It was also grown in the Virginia and Pennsylvania colonies and cultivated at a very early date in the settlements of Kentucky from whence it spread to Missouri and westward with the settlers. It is now abundant as a wild plant in many localities often growing along hedgerows, river banks and roadsides. It is not known when the plant was introduced to the Southwest and Mexico, but probably along with the early Spanish settlers.

Formerly, the majority, if not all, the imports of cannabis into the United States were from India where hemp was largely cultivated for smoking purposes. The menace of the habit, which its culture made possible, led the Indian authorities to impose drastic restrictions on its production, hence the supply of hemp required by the United States had to be sought elsewhere. Thus, the domestic industry, mostly in Kentucky and the Illinois river valleys, came into being.

The early cultivation of hemp in the United States was of the small European variety but this was replaced around 1850 by the larger Chinese hemp. A great deal of hemp fiber was also produced in Russia, formerly a principal source for American importation. The use of hemp fiber in the manufacture of rope in this country has been replaced almost entirely by Abaca or Manila fiber derived from a species of banana plant. When our source of supply for hemp from the Philippines was cut off during World War II, the hemp industry was revitalized for the war effort. However, it diminished following the war and no one has been licensed to grow domestic hemp since 1948.

Hemp grown in northern climates usually grows to a considerable height and produces more fiber than that grown in the southern latitudes where the plant is usually of the dwarf variety. Moreover, the short summers of the northern latitudes do not permit the seeds to ripen fully. Hemp grown in hot or subtropical humid climates usually produces more resin and hence is the plant of choice for clandestine use. Whether this high resin content is due in part to ecological conditions or is a built-in defensive mechanism of the plant has not been determined. The seeds themselves are void of alkaloids. Extracts prepared from the pollen dust are used to treat allergic manifestations.

While much has been written about the toxic effects of cannabis, little is known. The consensus among many investigators implies that the effects of the active principle, tetrahydrocannabinol seems limited

to the higher nerve centers. It produces first, an exaltation with more or less of a feeling of well being; a happy jovial mood, usually an increased feeling of physical strength and power; and a general euphoria. Accompanying this exaltation is a stimulation of the imagination followed by a more or less delirious state characterized by vivid kaleidoscopic visions, sometimes of a pleasing sensual kind, but occasionally of a gruesome nature. Accompanying this delirious state is a remarkable loss of spatial and time relations; persons and things in the environment look small; time is interminable; seconds seem like minutes and hours like days. While the delirium is one of degree it gradually merges, if the dose is sufficient, into a state of general motor weakness, fatigue, drowsiness and sleep.

No evidence exists that the drug is cumulative in its effect or that tolerance may develop through its continued use. Those who are habitually accustomed to the use of the drug are said to develop a delirious rage after its administration during which they are temporarily, at least irresponsible and prone to violence. This was the situation that existed on a national scale in the 1930's and prompted the 91st Congress to enact the "Marihuana Tax Act of 1937." The effects of this restrictive action were immediate and the misuse of marihuana declined rapidly. During and following World War II, the misuse of marihuana was practically unheard of. It was not until the 1960's that the drug began to regain its infamous reputation being reintroduced by the so called "drug culture". The effects of long term use of marihuana is unknown; however, the hallucinagenic effects of tetrahydrocannabinol is said to be several thousand times that of alcohol.

History tells us that the murderous frenzy of the Malays, characterized by running "amok," was the result of the habitual use of hashish. It is also reported that the Mohammadan leaders, opposing the Crusaders, utilized the services of individuals while under the influence of hashish to commit secret murders. The frenzy produced by the drug led these persons being called "haschischin", "hashihash" or "hashishi" from which the modern word "assassin" is derived.

The flowering tops leaves, and small stems are gathered, dried and usually smoked in a pipe or as a cigarette. Its use in cigarettes is the method most often chosen. Sometimes the resin is expressed or obtained by rolling the pods between the hands or "carpets" and then eaten. It has been reported that the Egyptians gathered the resin by donning leather jackets and walking through a field of shoulder high plants. The sticky resin which adhered to the jacket was then scraped off and utilized in the usual manner. However, the credibility of this tedious method is lacking in standard references.

The dried leaves and flowers rapidly lose their strength because tetrahydrocannabinol (THC), the active ingredient, deteriorates rapidly. Much of the alkaloid is lost after drying or storing for a short time.

From the early 1900's to 1937, many pharmaceutical preparations containing resin extracts of cannabis were readily available and were promoted extensively as analgesics and sedatives. Clinicians, however, soon learned that these preparations, rather than contributing to the treatment of clinical disorders, actually manifested their symptoms and caused such untoward side effects as to preclude their use. Shortly

after the passage of the Marihuana Tax Act of 1937, the Food and Drug Administration declared these preparations to be without medical utility and they were removed from the market place.

Scattered stands of wild hemp are reported each year throughout the United States. The plants are indigenous to many areas and are adaptable to almost every type of soil and climatic conditions except those in the extreme northern latitudes.

The total area of wild hemp in the United States is conservatively estimated to be in excess of 154,000 acres. The heaviest infestation tends to follow the corn belt in the States of Iowa, Kansas, Nebraska and Missouri while the lowest level of infestation occupies an area from Indiana eastward through New England with the exception of Maine. Moderate growth occurs in the Virginias, Tennessee, Kentucky and Ohio while scattered growth occurs along the southern tier of states.

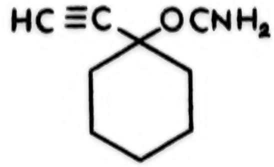
The problems of controlling the wild growth are many; namely, (1) the lack of recognition of the plants by the land owners, (2) the tendency of the plant to grow in small widely scattered stands and its ability to adapt to many types of habitats, (3) the resistance of the mature plants to herbicides and (4) the production of viable seeds over a ten to twelve weeks period from mid July to mid October.

DESTRUCTION OF WILD CANNABIS BY LOCAL, STATE AND FEDERAL AUTHORITIES

Year	Acres
1962	2,218
1963	2,158
1964	1,630
1965	1,925
1966	1,996
1967	1,466
1968	2,170
1969	576
1970	8,931
1971	1,773
1972	9,021

4. CARBAMIC ACID 1-ETHYNYLCYCLOHEXYL ESTER
Ethynylcyclohexyl; Ethinamate; Valmid; Schedule IV; oral Rx; CSA Code #-2545; Form 236.

$C_9H_{13}NO_2$



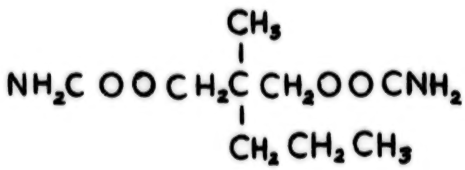
Molecular weight - 167.20

5. CARBAMIC ACID 2-METHYL-2-PROPYLTRIMETHYLENE ESTER
2-methyl-2-n-propyl-1, 3-propanediol discarbamate; meprobamate; Schedule IV; oral Rx; CSA Code #-2820; Form 236. Manufactured and/or distributed under generic and several trade names.

$C_9H_{18}N_2O_4$

Molecular weight - 218.25

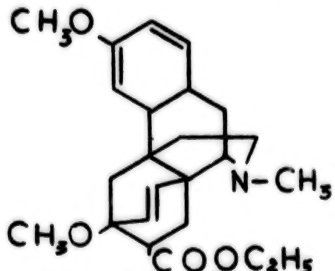
Percentage of anhydrous base - 100



6. 7-CARBETHOXY-6, 14-ENDO-ETHENO-TETRAHYDROTHEBAINE
M-51; a thebaine derivative; Schedule I; No CSA Code assigned; Import/Export permits required.

$C_{24}H_{29}NO_5$

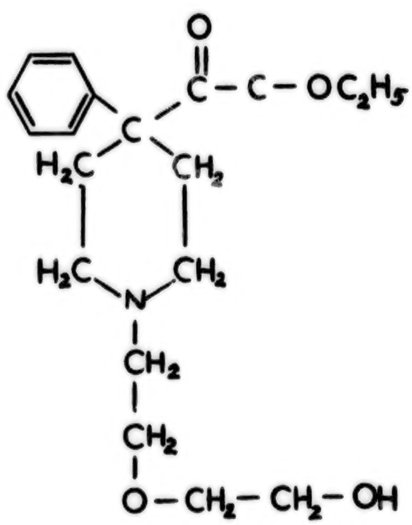
Molecular weight - 411.48



7. CARBETIDINE
Atenorax; Atenos; Etoxeridine; (International Non-Proprietary name); 1-[2-(2-hydroxyethoxy)-ethyl]-4-phenylpiperidine-4-carboxylic acid ethyl ester; Schedule I; CSA Code #-9625; Import/Export permits required.

$C_{18}H_{27}NO_4$

Molecular weight - 321.40

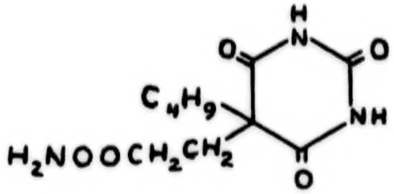


8. CARBUBARBITAL

Carbamic acid ester/5 butyl-5-(2-hydroxyethyl) barbituric acid; Schedule III; oral Rx; CSA Code #-2100; Form 236.

$C_{11}H_{17}N_3O_5$

Molecular weight - 271.27



9. CHLORAL BETAINE

Beta-chlor; Somilan; a chloral hydrate derivative; Schedule IV; oral Rx; CSA Code #-2460; Form 236.

$C_7H_{14}Cl_3NO_4$

$$CCL_3CH(OH)_2 \cdot (CH_3)_3\overset{+}{N}CH_2COO$$

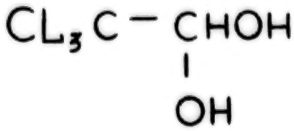
Molecular weight - 282.57

10. CHLORAL HYDRATE

2,2,2-trichloro-1, 1-ethanediol; trichloroacetaldehyde monohydrate; Noctec; Lorinal; Schedule IV; oral Rx; CSA Code #-2465; Form 236.

$C_2H_3Cl_3O_2$

Molecular weight - 165.42

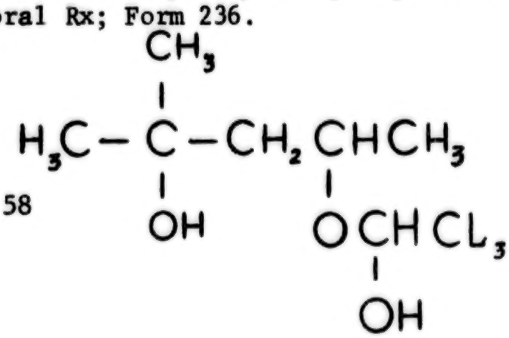


11. CHLORHEXADOL*

2-methyl-4-(2,2,2-trichloro-1-hydroxyethoxy-2-pentanol); Schedule III; CSA Code #-2510; oral Rx; Form 236.

$C_8H_{15}Cl_3O_3$

Molecular weight - 265.58

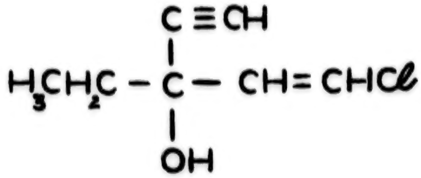


*Corrigendum - Spelled CHORHEXADOL in the Law.

12. 1-CHLORO-3-ETHYL-1-PENTEN-4-YN-3-OL
Ethchlorvynol; ethyl B-chlorovinyl-ethynyl carbinol; Placidyl Ethchlorvinyl; Schedule IV; oral Rx; CSA Code #-2540; Form 236.

$C_7H_9C_{10}$

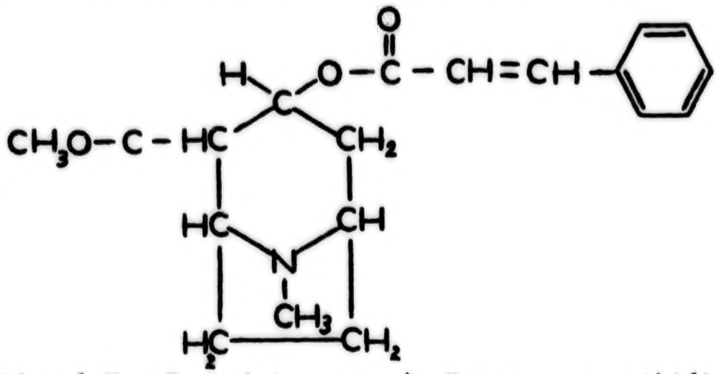
Molecular weight - 144.61



13. CINNAMOYLCOCAINE
Ecgonine cinnamoyl methyl ester; Cinnamoyl ecgonine methyl ester; a natural occuring alkaloid in the coca leaf. Generally the presence of cinnamoylcocaine in a cocaine sample is indicative of illicit origin; Schedule II; CSA Code #-9183; without current medical utility; Import/Export permits required.

$C_{19}H_{23}NO_4$

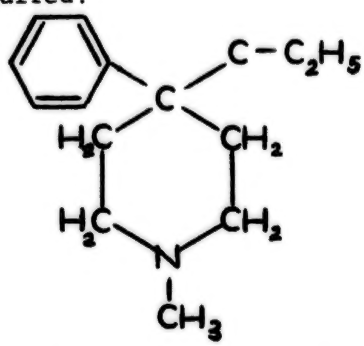
Molecular weight - 329.38



14. CLIRADON
Ketobemidone, (International Non-Proprietary name); Ketogan; a pethidine derivative; 4-(3-hydroxyphenyl)-1-methyl-4-piperidyl ethyl ketone or 1-methyl-4-methahydroxy-phenyl-4-propinylpiperidine; Schedule I; CSA Code #-9628; Import/Export permits required.

$C_{15}H_{21}NO_2$

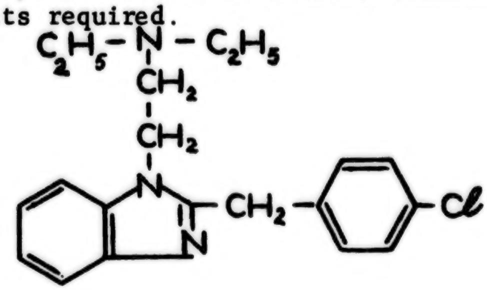
Molecular weight - 247.33



15. CLONITAZENE
2-(p-chlorobenzyl)-diethylaminoethyl-4-nitrobenzimidazole; Schedule I; CSA Code #-9612; Import/Export permits required.

$C_{20}H_{23}N_4O_2CL$

Molecular weight - 386.87



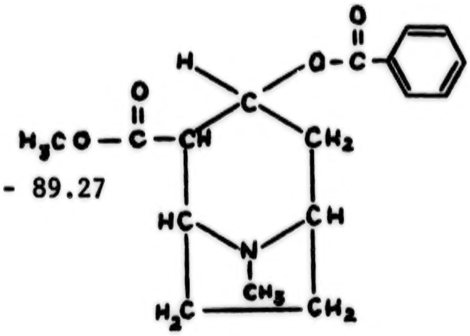
16. COCAINE

The methyl ester of benzoylecgonine; an alkaloid found in coca leaves or prepared by synthesis from ecgonine; Schedule II; written Rx; CSA Code #-9041; Import/Export permits required.

$C_{17}H_{21}NO_4$

Molecular weight - 303.35

HCL - Percentage of anhydrous base - 89.27

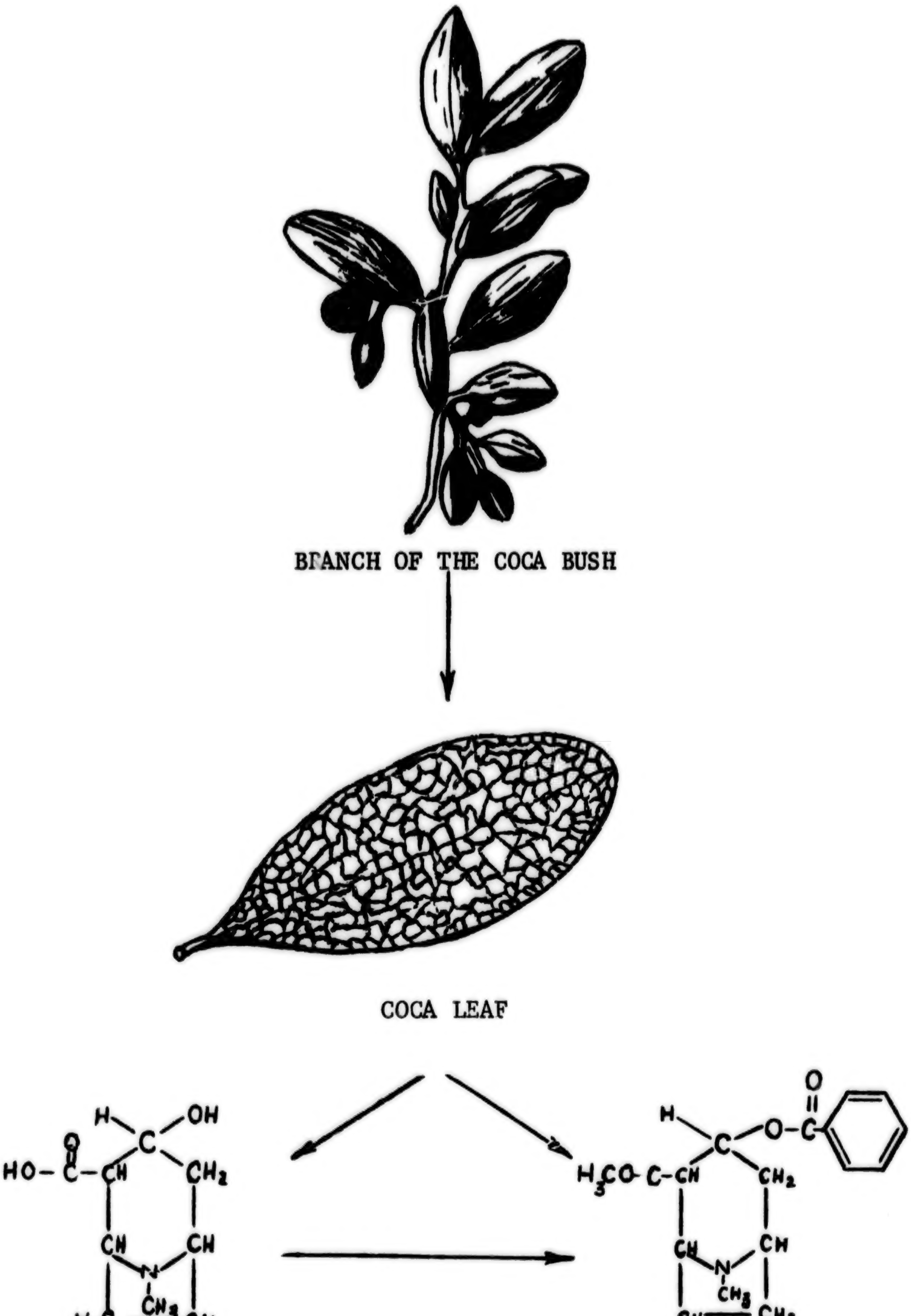


17. COCA LEAVES - (C.S.A. Code #- 9041) (Schedule II)

"The leaf of the Erythroxylon coca, Lamerack and the Erythroxylon novogranatense, Morris; Erythroxylon hieronymus and their varieties, belonging to the Family of Erythroxylaceae, and the leaf of other species of this genus from which it may be found possible to extract cocaine either directly or by chemical transformation." (International Opium Convention, 1925, Article I)

"The leaf of the coca bush except a leaf from which all ecgonine, cocaine and other ecgonine alkaloids have been removed." (Single Convention on Narcotic Drugs, 1961, Article I, paragraph I)

Does not include "decocainized" leaves or the extractions which do not contain cocaine or ecgonine.



Erythroxylon coca, Lamarck and its two principle derivatives.

Plate No. 2

COCA
Erythroxylon coca

Historical

Chewing coca is an old habit among the South American Indians, however, its genesis is lost in antiquity. The conquerors of Peru more than four centuries ago, first told of how the Indians chewed the leaves from sunrise to sunset to make them insensible to hunger and add to their strength and vigor. When used for pleasure the leaves were mixed with tobacco, lime or charcoal and chewed until the user succumbed to euphoric intoxication. During religious ceremonies, the Inca priests chewed coca provided by the congregation to propitiate the favor of the gods, and the supplicator, for devine grace always approached the priest with an "acullica" or chaw in his mouth. The plant was so revered that the priest always expectorated coca juice on the fire before sacrificing human victims to the gods. Even today the Peruvian Indians place coca in the mouths of the deceased to insure a favorable reception in the next world, and if a dying man can taste a leaf placed on his tongue, it is a sure sign of future happiness.

Christian missionaries, in their zeal to convert the heathen Indians, deemed coca to be a curse of the devil. The second Council of Lima in 1567[1] condemmed the use of coca as "a worthless object, fitted for the misuse and superstition of the Indians" and declared that notions entertained by the natives were illusions of the devil. During the rule of Toledo, the fifth viceroy, over 70 ordanances concerning coca were issued. However, opposition from the natives and the wealthy ruling class, who depended on the enslaved Indians for their wealth, soon overcame religious zeal and coca leaves were

[1]Blake, The Divine Plant of the Incas. Agriculture in the Americas, June 1943.

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rationed to the laborers in proportion to the severity of the labor required. In fact, the use of coca increased rather than diminished-a natural consequence in defiance of prohibitive laws.

The fidelity of the present day Indians to coca is due to supersitious ideas retained from ancient times and the necessity to survive "modern" living in South America. The Indian whose meager fare consists of maize, dried meat and potatoes rely on coca to sustain his strength, in many cases, for mere survival. Without the physical fortification of coca, he could not perform the gruelling work required in the mines. As an escape from their slave-like existance, it is not surprising that many will intoxicate themselves for several weeks, hidden in the deepest forest, in order not to be disturbed in their search for the only pleasure they know. Notwithstanding the preventive measures adopted by the Peruvian authorities, clandestine use of coca is unabated among Indians and many Peruvians alike.

Botanical

The name coca is derived from the Incan "cuca" or the Aymaran, "Khoka" meaning "The Tree". The first taxonomical reference to coca was made by Antoine Laurent de Jussieu in 1750. He assigned the plants to the genus Erythroxylon and finally they served as types for Lamarck to give the plant his designation, Erythroxylon coca, Lamarck.

The coca plant (family) Erythroxylaceae, (specie-Erythroxylon coca)[2] is native to the Peruvian mountains of South America from 70° South to 10° North. Either spontaneously or through cultivation, the coca shrubs have spread until they are now found in the whole eastern curve of the Andes,

[2]Grays, Manual of Botany.

from the Strait of Magellan to the borders of the Caribbean Sea, growing on the moist sides of the mountains at elevations from 4500 to 6100 feet. Coca is also cultivated in the East and West Indies, Ceylon, India and some parts of Africa. The wild coca shrub commonly reaches the height of 12 to 18 feet. The cultivated coca, however, is usually kept down to about 6 feet. The plants, propagated from seeds in nurseries, begin to yield in 18 months and continue productive for a half century.

The leaves of the different varieties of coca do not, on the whole, resemble one another closely, but are distinguished from most others by a slightly curved line on each side of the midrib, running from the base to the apex. The line has the appearance of a rib, but is really not-as this character having been produced during development by the peculiar folding of the leaf in the bud.

Hunauco Coca-leaves are greenish brown to clear brown, smooth and slightly glossly, stoutly, with little or no petiole, the blades are from one to three inches long and nearly elliptical with a very short and abruptly narrowed basal portion to a short point and the margin is entire; the midrib is mared above a slight ridge, very prominent underneath. The remaining venation is rather obscure, especially above; underneath, a conspicuous line of collenchyma tissue runs longitudinualy on either side of the midrib and about one-third of the distance between it and the margin. The enclosure areola is of slightly different color from the adjacent surface; the odor is characteristic; the taste is bitter and faintly aromatic, followed by a numbness of tongue, lips and fauces.

Truxilla Coca-leaves are pale green, thin brittle and usually much broken; smooth but not shining, shortly and stoutly petioled, the blades are from

6 to 12 inches long and one-third to one-half as broad, obovate to oblanceolate, narrowed from near the middle into the base to one half as broad, obovate to oblanceolate, narrowed from near the middle into the petiole, usually with a slight projecting point at the summit, the entire margin; underneath two irregular lines of collenchym tissue, usually incomplete or obscure, and frequently wanting, run beside the midrib at about one-third the distance from it to the margin, the odor of the Truxillo leaves is more tea-like than the Huanuco; their taste and numbing effect are similar. The midrib itself is prolonged into a narrow opiculus, which, however, is frequently broken off.

Production and Uses

The Chemical analysis of coca has been reported as follows:

Chemical Substance	% of total
Dextrine (Dextrina)	1.12
Sugars (Azucar)	11.46
Coloring matter and similar substances (Chlorofila)	.25
Starch (Almidon)	36.19
Cocaines and related alkaloids*	. 5 to 1.5
Protein (Fibrina)	7.80
Crude Fiber (Lenoso)	28.57
Volatile Oils (Aceite, Pectico)	1.82
Ash (Ceniza)	6.00
Moisture (Aqua)	6.50

The International Narcotic Control Board in their first report[3] cites that, "the quantities of coca leaves required annually for the legal manufacture of cocaine and as a flavoring agent for beverages vary between 200 and 500 tons; but statistics furnished to the Board by Bolivia and Peru, the

*Includes-Truxilline, Benzoyl Ecgonine, Cinnamoylcocaine, Hygrine, Cuchygrine and Tropacocaine. (Tropacocaine occurs only in Java coca leaves).

[3]First Report of the International Narcotics Control Board, E/INCB/1 page 14, November, 1968.

principal growing regions, reveal an annual harvest of 12,000 to 15,000 tons. Most of this chewed by the Andean Indians. Since the statistics are generally based on the actual tax records and in view of the inaccessibility and difficulty of control of much of the terrain, there is good reason to suppose that the harvest is in fact much greater than this. Clandestine manufacturers of cocaine therefore, have little difficulty in obtaining ample supplies of raw material and in recent years there have been definite signs that the illicit traffic in cocaine is increasing."

It is estimated that 8,000,000 of the world's population use coca leaves for chewing in their natural form, the majority of this number are in the Andean region of South America.[4] Most of the requirements of these people are supplied from the domestic crops produced within the boundaries of the countries in which they are consumed.

In both Bolivia and Peru, the principal producing countries of South America, the domestic market is far more important than the market for the export trade. Aside from the money value of the crop, domestic consumption in these areas is important because so much of the economic life of the regions is dependent upon the use of the leaves as a stimulant and liberator of energy necessary for the performances of the heavy and prolonged labor of the native population.

The position of coca leaves in world markets rests principally upon its use as a raw material source for the manufacture of cocaine. With the increase use of synthetic materials as substitutes for cocaine there has been a decline in cocaine production during the last decade. However, this has not served as a deterrant against over-production of the coca leaves. Argentina is the largest importer of leaves in their natural form. Most of the imports into

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[4]IBID-Blake

that country are used for chewing by the native Indians. The United States ranks next to Argentina in imports. The bulk of United States imports and exports* are processed for cocaine and most of this is exported to European countries. The balance of "spent leaves" (leaves from which all cocaine has been removed) are utilized in a non-narcotic flavoring extract.

The cultivation of Erythroxylon Coca (coca plant) is carried on today in the same manner as it was three hundred years ago.

Generally, the eastern slopes of the Andes below the 7,000 foot level are literally covered with coca bushes. The coca shrub is propagated from seed. For this purpose the seeds, immediately after gathering are sown in light sandy soil and watered frequently until the plants are 12 inches to 18 inches high, and should the hot sun strike the plants too violently they are protected with screens or mats. Ten to fifteen days after germination the plants are removed from their "nursery" and transplanted in terraced rows on the slopes of the mountains.

For ease in picking the leaves and cultivation, the plants are generally pruned frequently and kept at heights of 6 to 8 feet. Although the wild coca bush will attain a height of 40 feet or more, the ratio of alkaloids diminishes with age. The three varieties of Peruvian leafs contain cocaine, bi-coca alkaloids and flavoring waxes and are high in the bi-coca alkaloids. Java leaves are no longer imported into the United States.

Prior to World War II, Merck imported only Java leaves from the Dutch East Indies. These leaves while containing little or no actual cocaine did possess ecgonine which was methylated, having the benzyol group added, into methyl-benzyolecgonine, cocaine. However, with the invasion of these islands by the Japanese in the 1930's all the coca plantations were destroyed and were

*See Appendix I

not reestablished after World War II. Since that time Merck has relied on the domestic supplies of ecgonine from the Maywood Company.

A small crop of leaves are sometimes harvested at the end of the first growing season, and from this period to the age of forty years or more the shrubs continue to yield abundant supplies. However, most of the leaves are obtained from plants of from three to six years of age. The first gathering takes place at the expense of the lower leaves which are coarser and larger, but have less (cocaine) flavor. These are usually consumed by the pickers. The leaves are harvested three times, or exceptionally four times per year. The most abundant harvest occurs in March immediately after the rainy season and at the time of trimming the brushes from cut off twigs. The most scanty harvest takes place at the end of June or the beginning of July. The third is made in October or November.

The collection of the leaves is performed much in the same way as that of tea. It is, in general, performed by women and children. The plucked leaves are gathered in a cloth and afterwards collected in sacks weighing 125 to 150 pounds each and carried to the plantation. Here they are spread out in the sun in small stone courts and left until completely dry. Harvesting always takes place during dry weather so that the fresh leaves when spread out in layers of two to three inches thick can be dried in six to eight hours. Coca is very easily damaged by the combined effect of heat and moisture, therefore, it is always stored in dry, cool warehouses and rarely shipped during the damp or rainy season.

Aside from that portion of the harvest that is consumed by the pickers or sold openly by the Indians in the market place, the crop in theory, is under government control. However, these controls are oft times ignored. Virtually 98% of the production is used for non-medical purposes.

The Peruvian Government is unable to provide statistics on the exact quantities of coca harvested or on the number of hectares under cultivation. Their reports to the International Narcotic Control Board are based on quantities for which taxes have been collected. One can readily see that diversion of leaves to illicit sources may be accomplished quite readily.

There are two licensed importers of coca leaves in the United States; namely, Merck and Company of Rahway, New Jersey and Maywood Chemical Company of Maywood, New Jersey. However, the former company has not imported leaves for many years preferring to purchase the crude bi-alkaloids from Maywood and to synthesize the cocaine for sale to the domestic market.

Prior to applying for a permit to import coca leaves, the Maywood Company negotiates with the Peruvian authorities as to variety, price, assay, insurance, commission, legal fees, transportation, etc. An application is made to the Department of Justice for a permit to import that quantity of leaves, provided it does not exceed the importation quota previously established by the Bureau. If all is in order an import permit is issued and a corresponding export permit is issued by the Peruvian authorities. All international shipments of Schedules I and II substances must be made pursuant to this permit system which had its genesis in the 1925 International Convention and our Narcotic Drugs Import and Export Act of 1924.

The bales of leaves are laden aboard the vessel and stored in a sealed security area, accessible only to the master of the vessel. The import/export documents after manifesting the cargo, are retained in his possession and surrendered to the Custom officials at the port of import.

This Agency has no record of ever losing a shipment of coca leaves on the high seas or from the premises of the importing manufacturer.

Peruvian leaves are imported in bales bound in burlap and enclosed with metal bands, each bale weighing approximately 160 pounds, through the port of New York and moved to Maywood, New Jersey by truck, where the supply is equally distributed in two warehouses in order to prevent as much as possible the processes from being disrupted in case of fire. Both buildings are fire proof and very well protected with perimeter alarms, etc., to preclude thefts. Coca leaves are removed from either of these warehouses to the grinding departments as needed.

Cocaine

The principal alkaloid of coca, cocaine, was discovered by Saedke in 1658 and by Niemann and Lassen in 1659. As early as 1857, Samuel Peroy noted a decrease in the sensitivity of the tongue while chewing coca leaves, but it was not until 1882 that knowledge of the use of cocaine as an anesthetic really became known. The oculist Keller first used cocaine for desensitizing the cornea and conjunctiva. This was followed by the use of cocaine as an anesthetic by the throat specialists, Faurvel and Coupard. The leaves of the coca were included in the "Codex" of 1886 as natural substances. In 1895 cocaine and cocaine hydrochloride were included on the list of poisonous substances in the Supplement to the Codex subsequently, the Pharmacopeias of Argentina, Belgium, Spain, France, Italy, Rumania, Switzerland and Mexico include coca leaves and derivatives of coca leaves.

Realus, in 1890, advocated the use of cocaine as a local anesthetic for surgical operations. By the end of the 19th century, cocaine was in general use as a local anesthetic. During recent years, the medical use of cocaine has declined being replaced by synthetics such as procaine and novacaine which

lack the undesirable side effects of cocaine. Cocaine and its preparations are still used extensively in Europe by eye, nose and throat specialists.[5]

Flavoring Extracts

The use of coca leaves as flavoring in beverages came into use during the early eighties of the last century. In Europe, the use was largely associated with alcoholic beverages. In the United States, however, which is the principal market for coca leaves as a non-narcotic flavoring, utilization is confined to the soft drink industry and particularly to the production of Coca Cola. The use of coca as flavoring for soft drinks originated as a result of experiments of Dr. J.S. Pemberton of Atlanta, Georgia who evolved a formula for producing the beverage after three years of experimenting. T. M. Robinson, a friend of Dr. Pemberton, invented the trade mark, "Coca Cola" in 1886. During early years and in the experimental work, the natural leaves were used for the manufacture of the beverage. Subsequently this practice was abandoned and for many years only the decocainized leaves from which all cocaine and ecgonine have been extracted under government supervision have been used.[6]

This Government is interested in Coca Cola only in so far as the Controlled Substances Act may be concerned. The Federal Law is designed to prevent, not only the sale and distribution of narcotics as such, but the sale of any preparation from which constituents of coca cola are produced from coca leaves. The manufacturing process employed is understood to be designed to avoid, in the finished product, any trace of cocaine, ecgonine, or other dangerous habit-forming derivatives of the coca leaves.

[5] IBID-Blake

[6] Personal Communications

As a check to insure that this product is cocaine-free, government chemists analyze random samples of the extract and syrup.

Extraction Processes

1. Legitimate:

The coca leaves are reduced to a coarse powder by grinding and then alcohol is introduced by gravity which removes the active principles of the leaves. There are generally three washings with alcohol. The alcohol mixture (percolates) in the bottom of the tank are then piped to a still where the alcohol is distilled off and the residues, which are left are run through cooling coils to a wax tank. The recovered alcohol is reused for the next batch of leaves.

The residue in the wax tank is then mixed with water and heated by steam coils until the temperature reaches 60 degrees centigrade. The heat is turned off and cold water is then run through the coils in the tank; this cooking process goes on all night.

The following morning all the waxes have solidified on the top of the coils in the form of a hard cake. The liquid portion which contains most of the coca alkaloids is pumped out of the tank and through a filter. This filters out any suspended waxes. The waxes collected in the filter and those remaining on the coils in the tank are collected and treated. After the proper amount of flavoring has been obtained the wax residues are discarded.

The alcohol filtrate, obtained in the first process, is rendered alkaline with sodium carbonate, benzole is then added and the whole mixture, which now contains all the alkaloids is withdrawn. The balance of the solution i.e., the alcohol and sodium carbonate mixture is pumped to a still and the alcohol is distilled and recovered. The residue left after distillation of the alcohol is destroyed.

The benzole solution is pumped to another tank and agitated with sulfuric acid and water. The alkaloids combine with the sulfuric acid forming a soluble sulphate and goes into suspension in the aqueous layer. The benzole is withdrawn and returned to storage for use in the next lot.

Sodium carbonate is added to the acid solution to precipitate the coca alkaloids. These alkaloids are collected and dissolved in kerosene (gasoline was formerly used).

The liquid portion left after the alkaloids have been precipitated with sodium carbonate is sorted and used again in the next batch.

After the crude alkaloids have been dissolved in kerosene, the mixture is chilled which causes a heavy dark sedimentation to collect in the bottom of the tank, the top layer contains a mushy crystallization of natural cocaine.

This is scraped off and subjected several washings with kerosene and finally crystallized out of the kerosene. These are known as "gas crystals", and represent about 60% cocaine and 40% kerosene. The remaining dark portion in the bottom is known as the "A-Harz," a German word meaning residue. This "A-Harz" is subjected to four additional treatments with kerosene, i.e., it is shaken up with kerosene placed under refrigeration, and the residues after the natural cocaine has been removed are known as "B-Harz", "C-Harz" and "E-Harz". When the "E-Harz" stage has been reached, practically all natural cocaine has been stripped from the sediment, (See Synthetic Process).

The "Gas Crystals" are then dissolved in sulfuric acid. Pieces of ice are added to cool the mixture (to prevent the breaking-down of any of the cocaine), then potassium permanganate is added and the whole mixture is stirred for a period of time. The result of this process is the oxidation of the

cinnamyl cocaine and traces of other bi-alkaloids. When the process is complete the mixture treated with sodium carbonate which precipitates the cocaine alkaloids, the alkaloids are collected, dried and are known as "oxidation precipitates".

The oxidation precipitates are then dissolved in toluol and filtered. This removes any traces of manganese. The toluol solution is then treated with dry hydrochloric acid gas, the gas combines with the cocaine alkaloids, forming cocaine hydrochloride which is insoluble in toluol and it is precipitated. This precipitated cocaine hydrochloride is collected, centrifuged and dried. The dried powder is known as "Muriate", (synonym for hydrochloride).

The muriate is then subjected to three crystallizations from methyl alcohol. The final crystallization is known as "Columbian Spirit Crystals", and is retained in this form until converted into crystals, flakes or powder, depending on the market requirements.

Synthetic Process-to the E-Harz stage is added sulfuric acid and methyl alcohol. This mixture is subjected to low heat for a week. This process breaks down all the bi-alkaloids, still in the E-Harz stage, to ecgonine (Benzoyl ecgonine, cinnamyl and truxillic cocaine). The methyl alcohol and sulfuric acid together convert the base ecgonine into methyl ester of ecgonine. This is really two distinct chemical processes being carried out at the same time.

The ecgonine methyl ester is then treated with benzoyl anhydride forming methyl benzoyl ecgonine (or synthetic cocaine alkaloid). This synthetic alkaloid is then dissolved in toluol, the unconverted bi-coca alkaloid are not soluble in toluol. The toluol is then shaken with sulfuric acid and water.

The acid combines with the ecgonine methyl benzoylate forming cocaine sulfate which is treated with sodium carbonate causing the cocaine alkaloid to precipitate and it now enters the regular cocaine process at the "Gas Crystal" stage.

Illicit Process

The literature is almost void of references to illicit methods of extraction. However, since cocaine is soluble in many substances, the clandestine operator has devised several procedures. While many of these techniques seem to be rudimentary and lack the sophisication of the commercial processes, the operator usually succeeds in producing a relatively pure product. The cocaine, while lacking pharmaceutical elegance, is physiologically as effective as that produced in legitimate laboratories.

Cocaine is soluble in 700 parts of water, 20 parts of alcohol, freely soluble in chloroform, 3 parts of ether, 3 parts of benzol or toluol, 25 parts of petroleum spirits (kerosene or gasoline), 10 parts of melted vaseline, castor oil and many other fixed oils. Therefore, the great variety of solvents enables him to improvish accordingly.

The usual method is as follows:

The coca leaves are soaked in 40% solution of Carbonate of Sodium of 20° Baumé for 3 or 4 days. The mixture is then dried (reduced to powder) and exhausted by percolation with light petroleum spirits (kerosene). The cocaine which the alkaline carbonate set free is dissolved in the kerosene. This menstrum is concentrated and shaken up with water acidulated with one/tenth hydrochloric acid. The aqueous solution containing the hydrochlorate of cocaine is separated and allowed to deposit. The clear liquid is decanted, and from it the alkaloid is precipitated by the addition of carbonate of

sodium; about 98% of this precipitate when slightly washed and dried, is pure cocaine but, as it still contains some uncrystallizable matter, it is better to take up the precipitate formed on adding the alkaline carbonate by agitation with repeated portions of ether; the decanted ethereal liquors, when mixed, on evaporation will yield crystals of almost pure cocaine, or if agitated with hydrochloric acid, cocaine muriate will separate as a granular white powder.

No coloration is produced by dissolving pure cocaine or its hydrochloride in cold concentrated sulphuric acid; with the salt, effervescence occurs, owing to the release of hydrochloride gas. The reaction gives a faint evanescent yellow coloration; or a magenta tinge which gradually passes to brownish yellow and eventually the solution becomes almost colorless.

Restriction Orders and Regulations

The urgent necessity for the adoption of special measures to control the traffic and world trade in narcotics, and to prevent the spread of addiction to these drugs led to the formation of international agreements through which it was hoped these purposes might be accomplished. A European Convention for the Control of the manufacture and distribution of cocaine had existed since 1908 and upon the addition of the United States this became a World Convention. The first step to create an international front to fight narcotics was taken by President Taft in 1909, on the initiative of Bishop Brent of the Philippines.

The convening of the International Opium Convention at the Hague, January 23, 1912 marked the beginning of a series of similar meetings designed to restrict the illicit traffic in narcotic drugs. The declining prices during the next few years resulted in such a struggle among manufacturers that a meeting was called at Wiesbaden in July, 1914 to revive the Convention but

the opening of the European war prevented decisive action to regulate more effectively the control of production and price of cocaine until 1924. International Opium Convention again met at Geneva, February 19, 1925, and drafted the Convention for Limiting the Manufacture and Regulating the Distribution of Narcotic Drugs on July 13, 1931. Fifty three countries, including all of the countries of North and South America, and Europe and leading commercial countries of Asia and Africa and other areas of the World were signatories to an agreement to cooperate in an effort to regulate and control the distribution and trade in narcotic drugs. Subsequent indorsements brought the total number of signatories up to 64 nations.

The control of the licit trade in narcotic drugs is effected mainly through the operations of two independent narcotic bodies operating under the international conventions, the Supervisory Body and the Permanent Central Opium Board now called the International Narcotic Control Board. The headquarters of these bodies are located in Geneva, Switzerland. In the main, control is effected through the system of import certificates and export authorizations in force for the control of imports and exports of opium and coca leaves and their salts, derivatives, and preparations. The regulations and the plans adopted for controlling the traffic in these commodities has been so effective that nothing but flagrant bad faith on the part of signatory governments or thefts from medicinal stocks can put habit forming drugs into the illicit trade.

Regulations in Effect in the United States

The United States in discharging its obligations under the International Opium Convention and the Conventions of 1925 and 1931 for regulating the control and distribution of coca leaves and other narcotic drug materials had codified several prior Laws into the Controlled Substances Act of 1970 (Public Law 91-513).

Title III of the Act and the regulations pertaining to the trade in coca leaves provide that no coca leaves may not be imported into the United States or any territory under its control or jurisdiction; except such amounts as the Attorney General finds to be necessary to provide for medical and legitimate uses. Coca leaves may only be imported under formal permits issued by the Attorney General pursuant to a duly executed application therefore, and after a determination that the quantity of coca leaves requested in the application is necessary to provide for, and will be applied to, medical and legitimate uses only. An exception to so much of this rule as requires a formal permit may be made in the case of an emergency which, in the judgement of the Attorney General so effects the welfare of all or a large proportion of the population as to justify such extraordinary action. A permit signed and issued shall be authority to import, by the imported named thereon, one shipment only of the amount not to exceed the maximum quantity of coca leaves specified on the permit, stated in kilos from a designated foreign port of export, said shipment to be made on or before the date indicated for that purpose upon the permit.

No person shall in any manner export from or take out of the United States, or cause to be exported or taken out of the United States any coca leaves unless or until a permit, in due form, to export the narcotic drug in each instance shall have been issued by the Attorney General. The general provisions of these Acts vest in the Attorney General the power of making such regulations and exercising such authority as, in his opinion, is necessary in discharging the duties conferred and imposed upon him by these Acts and which will effectuate the intent and purpose of the Act.

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Importation of special coca leaves, in addition to the amount of leaves permitted to be imported under Title III of the Act, is authorized, however, such imports are subject to permission of the Attorney General, and in accordance with regulations issued by him: Provided, that after the entry thereof into the United States all cocaine, ecgonine, and all salts, derivatives, and preparations from which cocaine or ecgonine may be synthesized or made, contained in such additional amounts of coca leaves, shall be destroyed under the supervision of an authorized representative of the Attorney General.

Tariff Duties on Coca Leaves

Coca leaves were subject to a tariff of 10 cents per pound in the 3 tariff Acts of 1913, 1922 and 1930. Under the reciprocal trade agreement between the United States and Peru which became effective July 29, 1942, the rate for imports was reduced to 5 cents per pound, which rate, automatically became applicable to all other countries having "most-favored-nation" commercial treaties with the United States. The specific duty of 10 cents per pound which had remained in effect for the period 1913 through 1941 and until July 29, 1942, was roughly equivalent to about a 53 percent adavlorem duty. However, since 1965, coca leaves are admitted duty free since there are no domestic sources of supplies.

Coca Leaves imported:

YEAR	KILOGRAMS
1964	380,163.320
1965	271,920.285
1966	264,964.089
1967	245,856.417
1968	299,415.011
1969	268,679.074
1970	287,731.555
1971	246,066.207
1972	575,814.351

Cocaine exported (salts):

1964	794.8
1965	644.320
1966	154.706
1967	871.534
1968	412.404
1969	844
1970	766
1971	496
1972	507

18. CODEINE

Methylmorphine; a natural occuring alkaloid in opium; also prepared from morphine by selective methylation; Schedule II; CSA Code #-9050; written Rx; Import/Export permits required.

$C_{18}H_{21}NO_3 \cdot H_2O$

Molecular weight - 317.19

Acetate - Percentage of anhydrous base - 75.70

Alkaloid hydrous - 94.32

HBr - 71.91

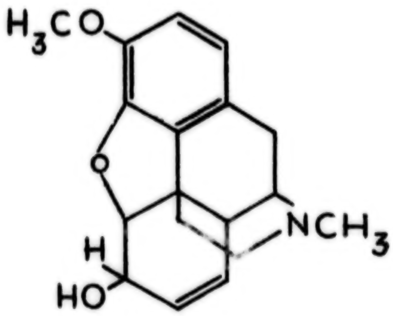
HCL - 80.50

Phosphate ($\frac{1}{2}H_2O$) - 74.00

Phosphate ($1\frac{1}{2}H_2O$) - 71.00

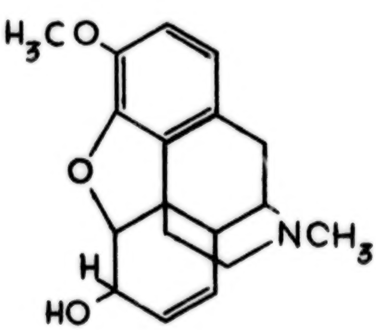
Sulfate ($3H_2O$) - 80.00

Sulfate ($5H_2O$) - 76.09



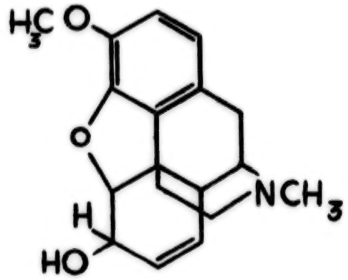
19. CODEINE

Preparations; Schedule III; oral Rx; CSA Code #-9803; Import/Export permits required; Not more than 1.8 grams of codeine(salts) per 100 milliliters (8.2 grains per 29.573 cc) or not more than 90 milligrams, (1.38 grains) as salts per dosage unit, with an equal or greater quantity of an isoquinoline alkaloid of opium; Copavin-Lilly etc.



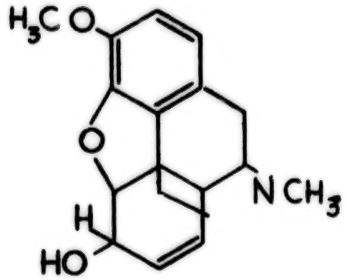
20. CODEINE

Preparations; Schedule III; oral Rx; CSA Code #-9804; not more than 1.8 grams of codeine(salts) per 100 milliliters (8.2 grains per 29.573 cc) or not more than 90 milligrams (1.38 grains) as salts per dosage unit with one or more active, nonnarcotic ingredients in recognized therapeutic amounts; A.P.F. with codeine, Empirin Compound with Codeine-Burroughs Wellcome; etc.



21. CODEINE

Preparations; Schedule V; O.T.C.; CSA Code 9100; not more than 200 milligrams of codeine per 100 milliliters of per 100 grams (.91 grains per 29.573 cc); Cheracol-Upjohn; Histadyl-E.c.-Lilly; Robitussin A.C.-Robins, etc; Form 236.



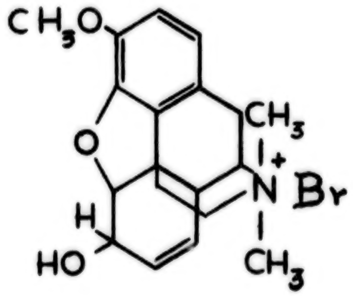
22. CODEINE METHYL BROMIDE

Eucodin; Eucodine; a quarternary amonium salt of codeine; Schedule I; CSA Code #-9070; Import/Export permits required.

$C_{18}H_{21}NO_3$

Molecular weight - 394.11

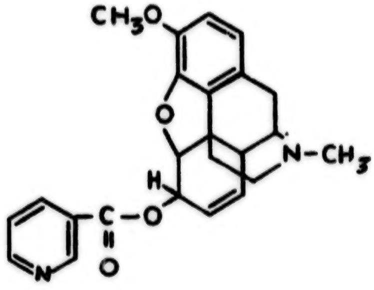
Percentage of anhydrous codeine base - 75.91



23. CODEINE NICOTINIC ACID ESTER
Nicocodeine; 6-nicotinylcodeine; Schedule I; CSA Code #-9309; Import/Export permits required.

$C_{24}H_{24}N_2O_4$

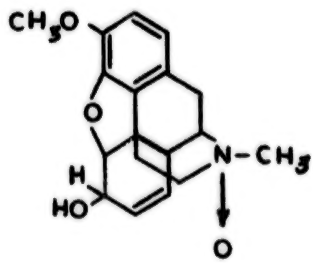
Molecular weight - 404.47



24. CODEINE-N-OXIDE
Genocodeine; N-Oxycodeine; Schedule I; CSA Code #-9053; Import/Export permits required.

$C_{18}H_{21}NO_4$

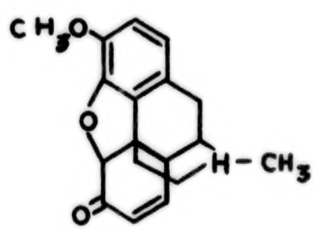
Molecular weight - 315.37



25. CODEINONE
An oxidation product of codeine containing two less hydrogen atoms. Considered to be the connecting link between thebaine and codeine. Schedule I; CSA Code assigned; Import/Export permits required.

$C_{18}H_{19}NO_3$

Molecular weight - 297.34

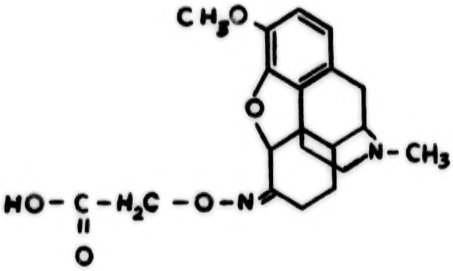


26. CODOXIME

A dihydrocodeinone derivative; dihydrocodeinone-6-carboxymethyloxome; [[7,71,8,9-tetrahydro-3-methoxy-12-methyl-4aH-8, 9c-iminoethanophen anthro- 4,5-bcd] furan-5(6H)-ylidene) amino] acetic acid; Not listed in any Schedule of the Law; however, it has no currently accepted medical use in treatment in the U.S. and is controlled under the Single Convention; Schedule I; CSA Code #-9102; Import/Export permits required.

$C_{20}H_{24}N_2O_5$

Molecular weight - 372.41

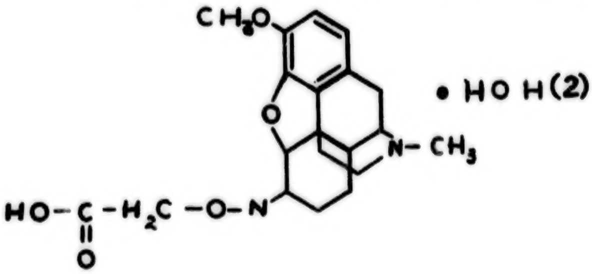


27. CODOXIME HYDRATE

Dihydrocodeinone-O-(carboxymethyl)-oxime dihydrate; a dihydrocodeinone derivative; Schedule I; CSA Code assigned none; Import/Export permits required.

$C_{20}H_{24}N_2O_5 \cdot 2H_2O$

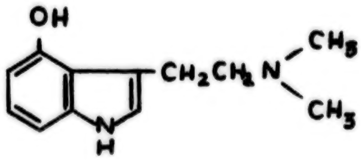
Molecular weight - 408.46



28. C X 59

Psilocyn; 3 [2-(Dimethylamino)ethyl)] indol-4-ol psilotsin; From the Fungus Psilocybe mexicana; Schedule I; CSA Code #-7438; Import/Export permits required.

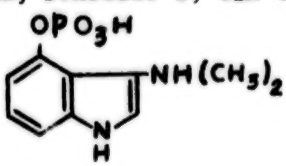
$C_{12}H_{15}ON_2$



Molecular weight - 203.37

29. CY 39

Psilocybin; 3- [2-(Dimethylamino)ethyl)] indol-4, ol dihydrogen phosphate ester; o-phosphoryl-4-hydroxy-N, N-dimethyltryptamine; psilotsibin; Indocybin; from the Fungus; Psilocybe mexicana; Schedule I; CSA Code #-7437; Import/Export permits required.



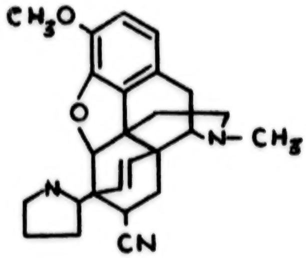
$C_{12}H_{17}N_2O_4P$

Molecular weight - 284.27

30. 7-CYANO-7,8-DIHYDRO-6-(1-PYRROLIDINYL)-6, 14-ENDO-ETHENOCODIDE
A codeinone derivative; Cl 108,469T; Schedule I; No CSA Code assigned; Import/Export permits required.

$C_{25}H_{29}N_3O_2$

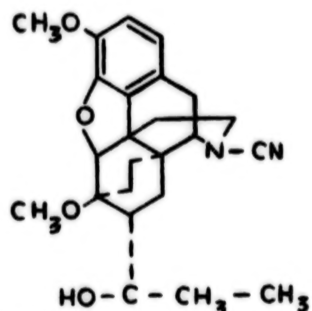
Molecular weight - 403.51



31. N-CYANO-7α-(1-HYDROXY-1-METHYL ETHYL)-6,7,8,14-TETRAHYDRO-6, 14-ENDO-ETHANONORTHEBAINE
R & S - M-5039

$C_{22}H_{21}N_2O_4$

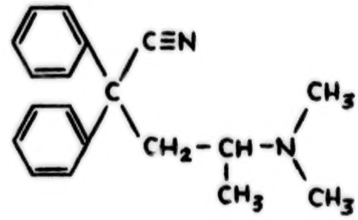
Molecular weight - 567.72



32. 4-CYANO-2-DIMETHYLAMINO-4, 4-DIPHENYL-BUTANE
Methadone intermediate, a methadone precursor; Schedule II; no medical utility; CSA Code #-9254.

$C_{19}H_{22}N_2$

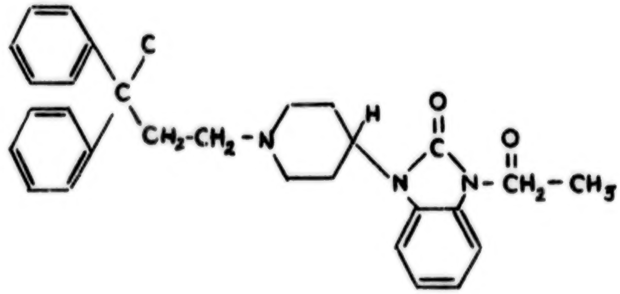
Molecular weight - 278.38



33. 1-(3-CYANO-3, 3-DIPHENYL-PROPYL)-4-(2-OXO-3-PROPIONYL-1 BENZIMIDAZO LINYL)-PIPERIDINE*
Bezitramide; a methadone derivative; R.4845; Schedule I; CSA Code #-9800; Import/Export permits required;

$C_{31}H_{32}N_4O_2$

Molecular weight - 386.87



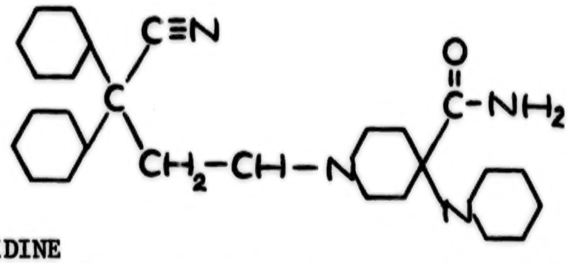
*Corrigendum-included in Schedule II(b) of the Law. However, it has no currently accepted medical use in treatment in the United States.

34. 1-(3-CYANO-3, 3-DIPHENYLPROPYL)-4-(1-PIPERIDINO)PIPERIDINE-4-CARBOXYLIC ACID AMIDE

Piritramide, (international nonproprietary name); R-3365; a methadone derivative; Schedule I; CSA Code #-9642; Import/Export permits required.

$C_{27}H_{34}N_4$

Molecular weight - 430.60

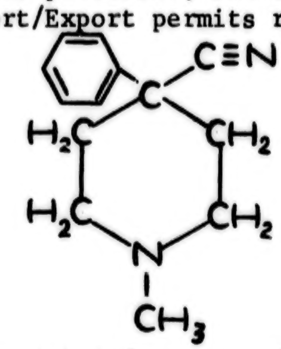


35. 4-CYANO-1-METHYL-4-PHENYLPIPERIDINE

Pethidine intermediate-A; a pethidine precursor; Schedule II; without medical utility; CSA Code #-9232; Import/Export permits required.

$C_{13}H_{16}N_2$

Molecular weight - 200.29

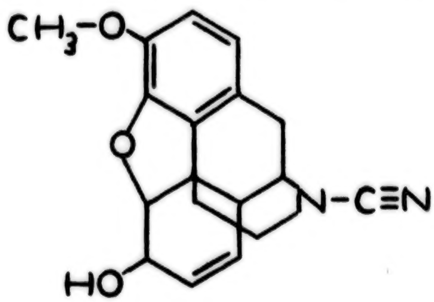


36. CYANONORCODEINE

A codeine derivative; Schedule I; No CSA Code assigned; Import/Export permits required.

$C_{17}H_{18}O_3N \cdot CN$

Molecular weight - 327.34



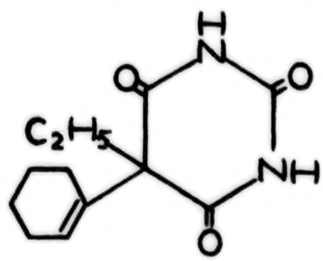
37. CYCLOBARBITAL

5-(1-cyclohexen-1-yl)-5-ethylbarbituric acid; Schedule III; oral Rx; CSA Code #-2100; Form 236.

$C_{12}H_{16}N_2O_3$

Molecular weight - 236.26

Ca Salt - Percentage of anhydrous base - 85.27

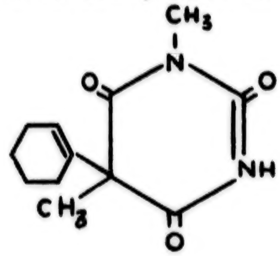


38. 5-(1-CYCLOHEXEN-1-YL)-1,5-DIMETHYLBARBITURIC ACID
Hexobarbital; Bardiorm; Carohexon; Citodan; Cyclonal; Dorico; Esobarbital; Evipal; Fortronal; Hexenal; Hexopal; Litarin; Medipan; Methylhexabarbital; Narcodorm; Schedule III; CSA Code #-2100; Form 236.

$C_{12}H_{16}N_2O_3$

Molecular weight - 236.26

Na Salt - Percentage of anhydrous base - 91.48

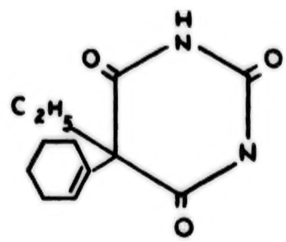


39. 5-(1-CYCLOHEXEN-1-YL)-5-ETHYLBARBITURIC ACID
Cyclobarbital; Schedule III; oral Rx; CSA Code #-2100; Form 236.

$C_{12}H_{16}N_2O_3$

Molecular weight - 236.26

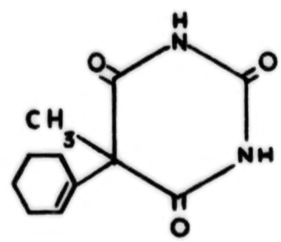
Ca Salt - Percentage of anhydrous base - 85.27



40. 5-CYCLOHEXEN-1-YL-5-METHYLBARBITURIC ACID
Norhexobarbital; Norhexobarbitone; Schedule III; oral Rx; CSA Code #-2100; Form 236.

$C_{11}H_{14}N_2O_3$

Molecular weight - 222.08

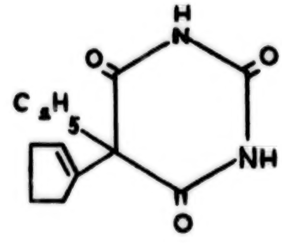


41. 5-CYCLOPENTENYL-5-ETHYLBARBITURIC ACID
Pentenal; Schedule III; oral Rx; CSA Code #-2100; Form 236.

$C_{11}H_{14}N_2O_3$

Molecular weight - 223.11

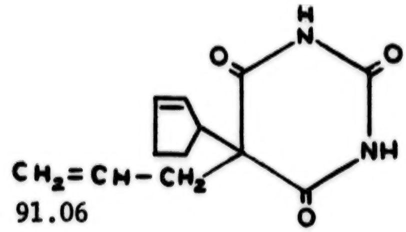
Na Salt - Percentage of anhydrous base - 77.83



42. CYCLOPENTOBARBITAL

5-allyl-5-(2-Cyclopenten-1-yl) barbituric acid; Cyclopal; Schedule III; CSA Code #-2100; Form 236.

$C_{12}H_{14}N_2O_3$



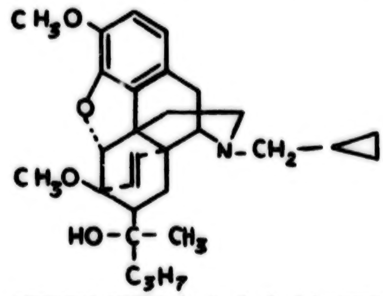
Molecular weight - 234.35

Na Salt - Percentage of anhydrous base - 91.06

43. N-CYCLOPROPYLMETHYL-7-ALPHA-(1-HYDROXY-1-METHYLBUTYL)-6,7,8,14-TETRAHYDRO-6,14-<u>ENDO</u>-ETHENONORTHEBAINE

M-281; a thebaine derivative; Schedule I; No CSA Code assigned; Import/Export permits required.

$C_{29}H_{39}NO_4$

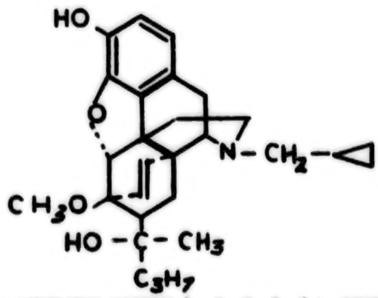


Molecular weight - 465.61

44. N-CYCLOPROPYLMETHYL-7-ALPHA-(1-HYDROXY-1-METHYLBUTYL)-6,7,8,14-TETRAHYDRO-6,14-<u>ENDO</u>-ENTHENONORORIPAVINE

M-289; a thebaine derivative; Schedule I; No CSA Code assigned; Research only; Import/Export permits required.

$C_{28}H_{37}NO_4$

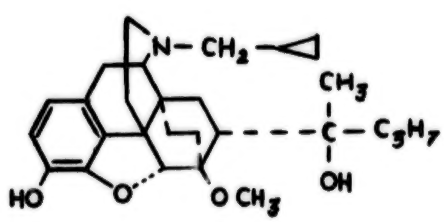


Molecular weight - 451.58

45. N-CYCLOPROPYLMETHYL-7-ALPHA-(1-HYDROXY-1-METHYLBUTYL)-6,7,8,14-TETRAHYDRO-6,14-<u>ENDO</u>-ETHANONORORIPAVINE

M-6007; a thebaine derivative; Schedule I; No CSA Code assigned; Import/Export permits required.

$C_{28}H_{39}NO_4$

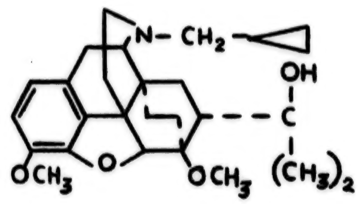


Molecular weight - 453.60

46. N-CYCLOPROPYLMETHYL-7α-(1-HYDROXY-1-METHYLETHYL)-6,7,8,14-TETRAHYDRO-6,14-ENDO ETHANONORTHEBAINE
R & S-M-5046

$C_{27}H_{36}NO_4$

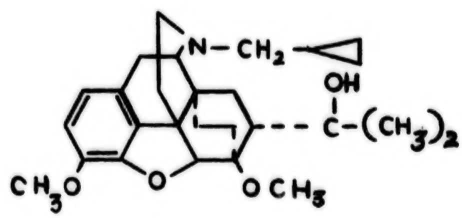
Molecular weight - 438.55



47. N-CYCLOPROPYLMETHYL-7 ALPHA-(1-HYDROXY-1-METHYLETHYL)-6,7,8,14-TETRAHYDRO-6,14-ENDO-ETHANONORTHEBAINE
M-5056, (Lederle); a thebaine derivative; Schedule I; No CSA Code assigned; Import/Export permits required.

$C_{25}H_{29}NO_4$

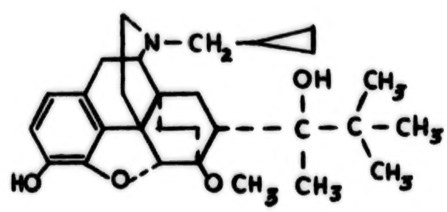
Molecular weight - 407.48



48. N-CYCLOPROPYLMETHYL-7 ALPHA(1-HYDROXY-1,2,2-TRIMETHYLPROPYL)-6,7,8,14-TETRAHYDRO-6,14-ENDO-ETHANONORORIPAVINE
M-6029; a thebaine derivative; Schedule I; No CSA Code assigned; Import/Export permits required.

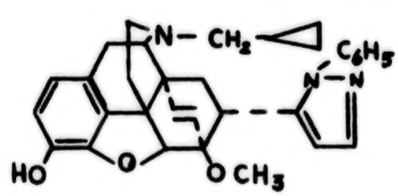
$C_{29}H_{41}NO_4$

Molecular weight - 467.63



49. N-CYCLOPROPYLMETHYL-7 ALPHA(1-PHENYL-5-PYRAZOLYL)-6,7,8,14-TETRAHYDRO-6,14-ENDO - ETHENONORORIPAVINE
Base-CL110,280, (Lederle); Citrate-CL110,292, (Lederle); a thebaine derivative; Schedule I; No CSA Code assigned; Research only; Import/Export permits required.

$C_{32}H_{33}N_3O_3$



Molecular weight - 507.61

Citrate - Percentage of anhydrous base - 72.6

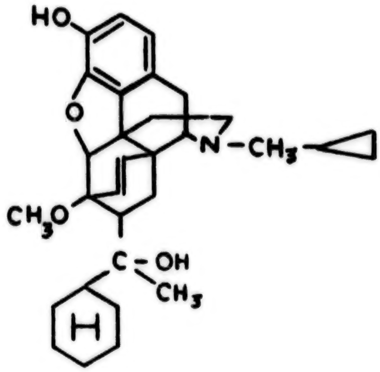
50. N-CYCLOPROPYLMETHYL-6,14-ENDOETHENO-7-(1-HYDROXY-1-CYCLOHEXYL-1-ETHYL) TETRAHYDRONORORIPAVINE

M-306; a thebaine derivative; Schedule I; No CSA Code assigned; Import/Export permits required.

$C_{31}H_{41}NO_4$

Molecular weight - 491.65

HCL - Percentage of anhydrous base - 93.1

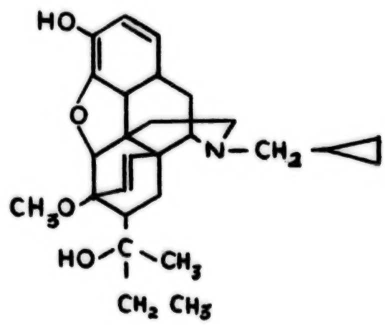


51. N-CYCLOPROPYLMETHYL-6,14-ENDO-ETHENO-7-(2-HYDROXY-2-BUTYL)-TETRAHYDRO-NORORIPAVINE

M-5217; Schedule I; No CSA Code assigned; Import/Export permits required.

$C_{27}H_{35}NO_4$

Molecular weight - 437.56



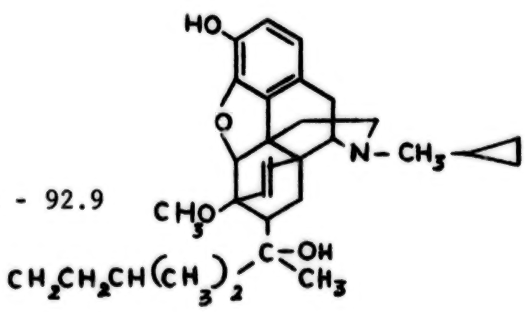
52. N-CYCLOPROPYLMETHYL-6,14-ENDOETHENO-7(2-HYDROXY-5-METHYL-2-HEXYL) TETRAHYDRONORORIPAVINE

M-320; a thebaine derivative; Schedule I; No CSA Code assigned; Import/Export permits required.

$C_{30}H_{41}NO_4$

Molecular weight - 479.64

HCL - Percentage of anhydrous base - 92.9

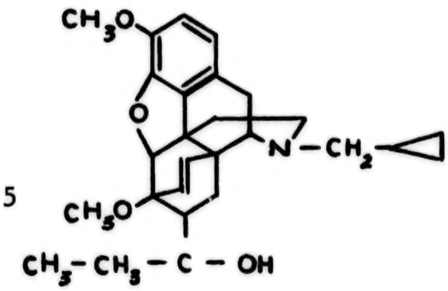


53. N-CYCLOPROPYLMETHYL-6,14-<u>ENDO</u>-ETHENO-7-(2-HYDROXY-2-PROPYL) TETRAHYDRO-NORTHEBAINE
M-278; a thebaine derivative; Schedule I; No CSA Code assigned; Import/Export permits required.

$C_{27}H_{35}NO_4$

Molecular weight - 437.56

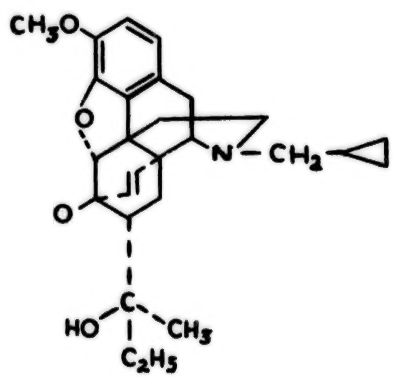
HCL - Percentage of anhydrous base - 92.5



54. N-CYCLOPROPYLMETHYL-7α [1-(R)-HYDROXY-1-METHYLPROPYL]-6,7,8,14-TETRAHYDRO-6,14-<u>ENDO</u>ETHENONORTHEBAINE
M-5205; Schedule I; a thebaine derivative; No CSA Code assigned; Import/Export permits required.

$C_{28}H_{37}NO_4$

Molecular weight - 451.58

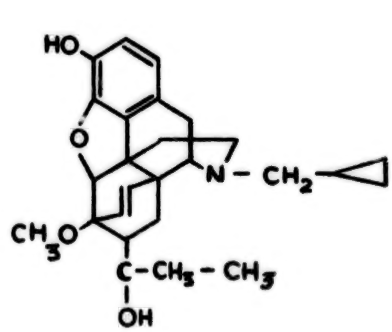


55. N-CYCLOPROPYLMETHYL-6,14-<u>ENDO</u>ETHENO-7-(2-HYDROXY-2-PROPYL) TETRAHYDRONOR-ORIPAVINE
M-285; cyprenorphine; a thebaine derivative; Schedule I; CSA Code #-9054; Import/Export permits required; a narcotic antogonist-not under international control.

$C_{22}H_{33}NO_4$

Molecular weight - 423.53

HCL - Percentage of anhydrous base - 92.0

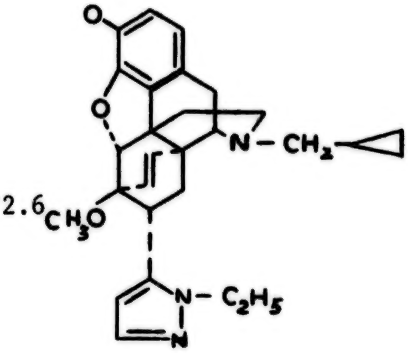


56. N-CYCLOPROPYLMETHYL-7α-(1-PHENYL-5-PYRAZOLYL)-6,7,8,14-TETRAHYDRO-6,14-<u>ENDO</u> ETHENONORIPAVINE
Schedule I; No CSA Code assigned; Research only; Import/Export permits required.

$C_{32}H_{33}N_{3}O_{3}$

Molecular weight - 507.61

Citrate - Percentage of anhydrous base - 72.6

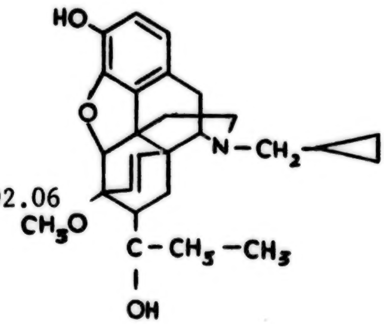


57. CYPRENORPHINE
The hydrochloride salt; M-285; a narcotic antagonist-not under international control; N-(Cyclopropylmethyl) tetrahydro-7 alpha-(1-hydroxy-1-methylethyl)-6,14-<u>endo</u>-ethenonororipavine; a thebaine derivative; Schedule I; CSA Code #-9054; Import/Export permits required.

$C_{26}H_{33}NO_{4}$

Molecular weight - 423.53

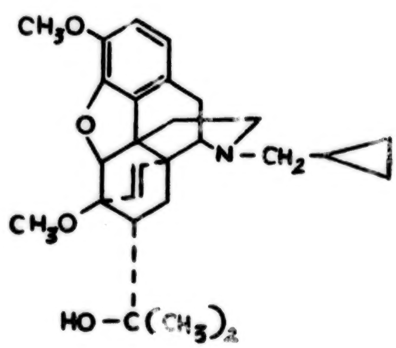
HCL Salt - Percentage of anhydrous base - 92.06



58. N-CYCLOPROPYLMETHYL-7α-(1-HYDROXY-1-METHYLETHYL)-6,7,8,14-TETRAHYDRO-6,14-<u>ENDO</u> ETHANONORORIPAVINE
Diprenorphine; M-5050; Schedule I; CSA Code #-9058; Import/Export permits required; Diprenorphine is a narcotic antagonist and not subject to international controls.

$C_{25}H_{29}NO_{4}$

Molecular weight -



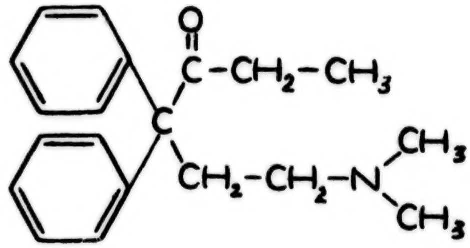
D

1. DEATUSSAN

Normethadone; Mepidon; Normedon; Phenyl-dimazone; Ticarda; Veryl; 4,4-diphenyl-6-dimethylamino-3-hexanone; Schedule I; CSA Code #-9635; Import/Export permits required.

$C_{20}H_{25}NO$

Molecular weight - 295.40

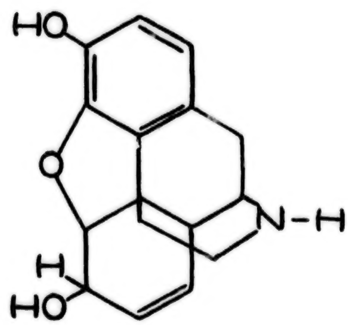


2. N-DEMETHYLMORPHINE

Normorphine; Schedule I; CSA Code #-9313; Import/Export permits required.

$C_{16}H_{17}NO_3$

Molecular weight - 271.32

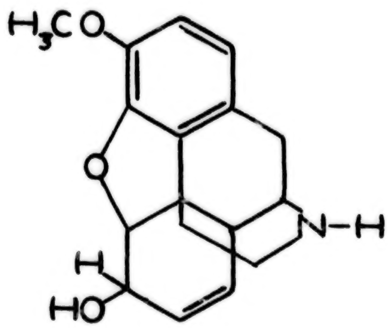


3. N-DESMETHYLCODEINE

Norcodeine; normorphine-3-methyl ether; Schedule I; CSA Code #-9104; Import/Export permits required.

$C_{17}H_{19}NO_3$

Molecular weight - 285.33



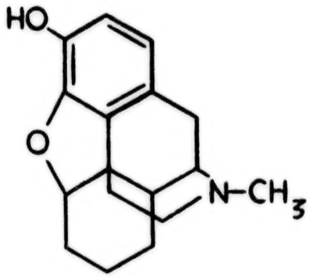
4. DESOMORPHINE

Dihydrodesoxymorphine-d; 6-methyl-6-desoxymorphine; methyl desomorphine; Schedule I; CSA Code #-9055; Import/Export permits required.

$C_{17}H_{21}NO_2$

Molecular weight - 271.35

Percent of anhydrous base - 77.00

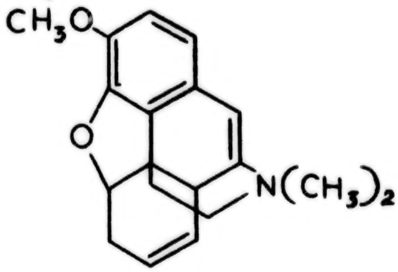


5. DESOXY-ALPHA-METHYLMORPHIMETHINE

A degradation product of dihydrodesoxycodeinone; Schedule I; No CSA Code assigned; Import/Export permits required.

$C_{19}H_{23}NO_2$

Molecular weight - 297.17

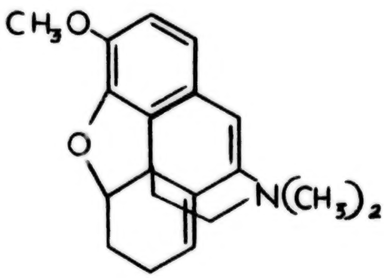


6. DESOXY-BETA-METHYLMORPHIMETHINE

A degradation product of dihydrodesoxy codeinone-D; Schedule I; No CSA Code assigned; Import/Export permits required.

$C_{19}H_{23}NO_2$

Molecular weight - 297.17

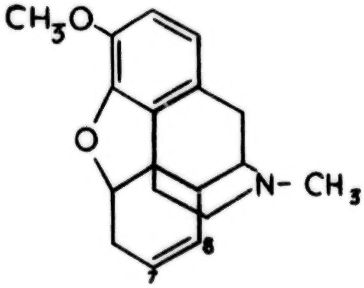


7. Δ^7-DESOXYCODEINE

Desoxyneopine; desoxycodeine; Schedule I; No CSA Code assigned; Import/Export permits required.

$C_{18}H_{21}NO_2$

Molecular weight - 283.16



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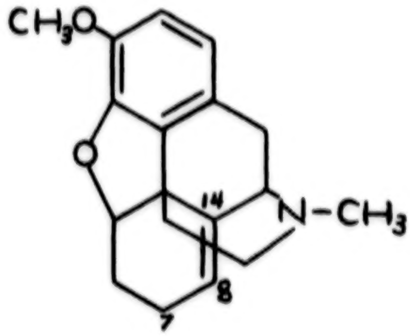
8. Δ^8-DESOXYCODEINE
Desoxyneopine; Desoxycodeine-D; Schedule I; No CSA Code assigned; Import/Export permits required.

$C_{18}H_{21}NO_2$

Molecular weight - 283.16



9. DESOXYEPHEDRINE
Methyl amphetamine; methamphetamine; Schedule II; written Rx; CSA Code #-1105; Import/Export permits required.

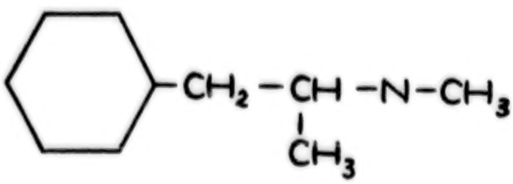
$C_{10}H_{15}N$

Molecular weight - 149.28

HCL Salt - Percentage of anhydrous base - 80.35

Potassium Saccharate - 41.51%

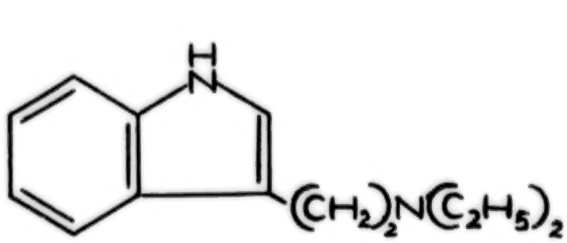
SO_4 - 60.84%



10. DET
Diethyltryptamine; T-9; 3-(2-Dimethylamino-ethyl)indole; Schedule I; hallucinagenic substance; CSA Code #-7434; Import/Export permits required.

$C_{14}H_{20}NO_2$

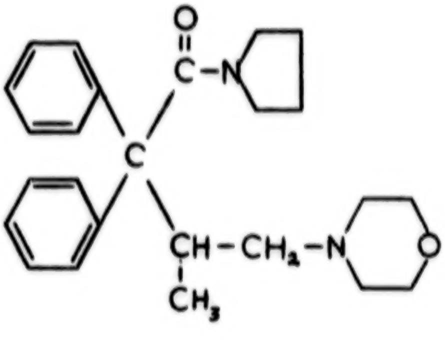
Molecular weight - 216.33



11. DEXTRO-3-METHYL-2, 2-DIPHENYL-4-MORPHOLINO-BUTYRYLPYRROLIDINE
Dextromoramide; palfium; jetrium; pyrrolamidol; R-875; S.K.F.-d-5137; d-2, 2-diphenyl-3-methyl-4-morpholino-butyryl-pyrrolidine; a methadone derivative; Schedule I; CSA Code #-392.55

$C_{25}H_{32}N_2O_2$

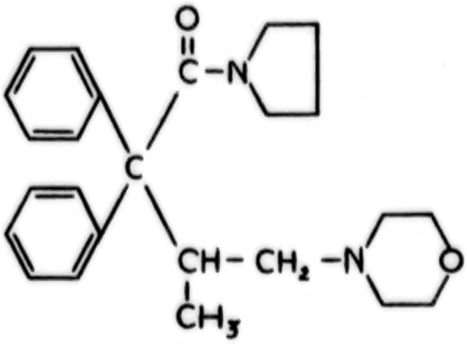
Molecular weight - 392.55



12. DEXTROMORAMIDE
Palfium, jetrium; pyrrolamidol; R-875; S.K.F.-d-5137; d-3-methyl-2, 2-diphenyl-4-morpholino-butyryl-pyrrolidine; d-2, 2-diphenyl-3-methyl-4-morpholino-butyrylpyrrolidine; a methadone derivative; Schedule I; CSA Code #-9613; Import/Export permits required.

$C_{25}H_{32}N_2O_2$

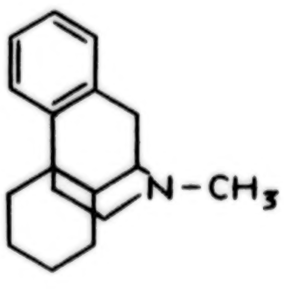
Molecular weignt - 392.55



13. DEXTRORPHAN
d-3-hydroxy-N-methylmorphinan. Except its methyl ether, Dextromethorphan; a morphinan derivative. The morphinan occur in the usual three optical isomers; i.e., the dextro, levo and racemic. While the levo and racemic forms are highly addictive narcotics and subject to full control both nationally and internationally, the dextro form exhibits no addictive liabilities and was exempted from control. It is now controlled as a Schedule I substances in the C.S.A., however, it is not controlled internationally; Schedule I; CSA Code #-9614; Import/Export permits required.

$C_{17}H_{23}NO$

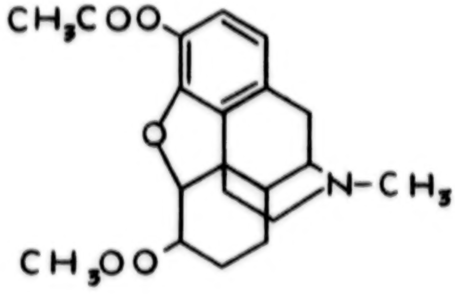
Molecular weight - 257.36



14. DIACETYLDIHYDROMORPHINE
Acetylated dihydromorphine; Schedule I; No CSA Code assigned; Research only; Import/Export permits required.

$C_{21}H_{25}NO_5$

Molecular weight - 371.42

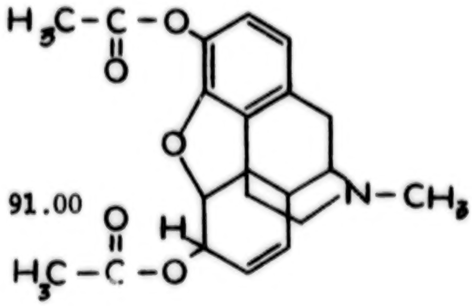


15. DIACETYLMORPHINE
Commonly known by its trade name, Heroin; diamorphine; Schedule I; CSA Code #-9200; Research only; Import/Export permits required.

$C_{21}H_{23}NO_5$

Molecular weight - 369.40

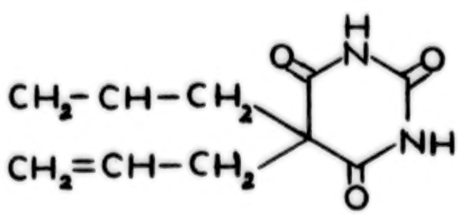
HCL Salt - Percentage of anhydrous base - 91.00



16. 5,5-DIALLYBARBITURIC ACID
Allobarbital; Allobarbitone; Barbidal; Dial; Schedule III; CSA Code #-2100; oral Rx; Form 236.

$C_{10}H_{12}N_2O_3$

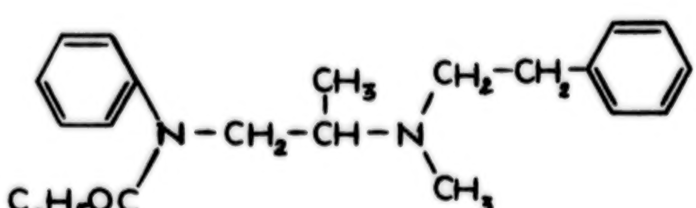
Molecular weight - 208.21



17. DIAMPROMIDE
N-[2(N-methylphenethyl-amino)-propyl]-propionailide; Schedule I; CSA Code #-9615; Import/Export permits required.

$C_{21}H_{28}N_2O$

Molecular weight - 257.36



DIACETYLMORPHINE-HEROIN

The word "Heroin" has become synonymous with the word addiction. While its analgesic and euphoric effects are short lived, but very intense, its addiction sustaining liabilities are most pronounced; hence, it is the drug of choice among the addicts. A subcutaneous dose of 1 to 2 milligrams is physiologically equivalent to 10 milligrams of morphine. Therefore, a clear understanding of its history, development, use and ultimate prohibition is desirable for a better understanding of the "heroin problem."

Historically, diacetylmorphine was first prepared and described by two English chemists, G.H. Beckett and C.P. Alder Wright in 1875.[1] Eight years later in 1883, a German chemist, O. Hesse, also prepared the compound by heating morphine with acetic acid.[2] However, it was not until 1889, that two Englishmen, Dott and Stockman, first studied its physiological properties.[3]

Diacetylmorphine was first placed on the market by the Farbenfarbriken vorm Friedrich Bayer and Company of Elberfeld, Germany in 1898 and it was one of its employees, H. Dreser, who named the compound "Heroin".[4] Dr. Dreser is generally credited with introducing the drug to the medical profession and has been erroneously referred to as its discoverer. There is no definite information available on the origin of the trade name, "Heroin", but it was probably coined by Dr. Dreser because its small but effective dose, placed it in the class of so-called "heroic remedies"; i.e. powerful remedies or those effective in small doses such as strychnine, arsenious acid, atrophine, etc. Further, the German word, "heroisch" literally means heroic, dynamic or powerful.

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[1] Journel of the Chemical Society, London, 1875, Vol. 28, pages 315-318.
[2] Liebig's Annalen der Chemie, 1883, Vol. 22, pages 205-206.
[3] Procedings of the Royal Sceiety of Edinburgh, 1890, Vol. 17, page 321.
[4] Archieves der gesam, Physilogie, 1898, Vol. 72, page 487.

Ironically, Heroin was first introduced by the Bayer Company as a cure for opium and morphine addiction and was claimed to be absolutely non-addictive. Some clinicians, however, did warn the medical profession about the dangers of chronic heroin addiction and recommended its abolition. The profession was not entirely receptive to these warnings and continued its use at an accelerated pace. This promiscuous use of the drug contributed to a sharp increase in the addict population and by 1910 there were 500,000 to 1,000,000 heroin addicts in the United States depending on whose survey was accepted. Nevertheless, the addiction problem was profound and the numbers of addicts were legion. At the same time the pronounced addictive properties of Heroin became well known to the illicit vendor and with the passage of the Harrison Act in 1914, which restricted its manufacture and distribution, it became a choice commodity in the illicit market.

The addict's preference, however, varies in different areas. In the Far East, including the Sub-Continent of Indochina, opium is preferred, in the Middle East, hashish is the drug of choice and in Central and South America, coca chewing has been a habit for centuries. Heroin has attracted much attention in the United States, North Africa and certain sections of China.

It was not until 1924 when Congress amended the Narcotic Drugs Import and Export Act that the importation of opium for the manufacture of diacetyl-morphine was prohibited and no authorized manufacture of the drug has taken place since that time. However, small quantities of the drug, produced before 1924, had remained in the channels of trade and its medical use where indicated, was not prohibited until July 19, 1956, when Public Law 728 was approved

requiring all stocks of the drug to be surrendered to the Federal government on or before November 19, 1956. Since that time its possession is unlawful and the drug is subject to confiscation.

Soon thereafter the production of diacetylmorphine was outlawed in many countries. Today only two countries authorize its legitimate production; namely, United Kingdom and Belgium. However, its manufacture in these countries has been reduced sharply in recent years.

Most diacetylmorphine produced today comes from clandestine sources, being made in the so-called kitchen laboratories. The base material, opium, is produced illegally, or diverted from legitimate stocks in countries which permit its harvest. The semi purified morphine alkaloid is extracted and converted by acetylation to diacetylmorphine. Generally, the operators of these clandestine laboratories are not skilled chemists and often times are injured by fire or explosion or poisoned by benzene fumes. Consequently, due to their lack of expertise, the product they produce is usually of poor quality and yields are relatively low. However, some knowledgeable operators succeed in producing diacetylmorphine of high purity.

An acceptable grade of opium contains between 9% and 14% anhydrous morphine. Base on an average of 10%, one kilogram (1000 grams) of opium yields 100 grams of morphine. The molecular weight of pure morphine alkaloid is 303.17 and the molecular weight of pure Heroin alkaloid is 369.40; thus, establishing a ratio of 303.17 to 369.40 or simply 1 to 1.22. Therefore, 10 kilograms of opium will yield one kilogram of pure morphine base which in turn will yield, theorically, 1.22 kilograms of pure heroin provided the reactions go to 100% completion and discounting any losses which might occur

during the chemical transformations. While it is possible to obtain a theoretical yield of 100%, legitimate laboratories obtain, at best, a maximum yield of 98.5%. The clandestine operator generally average between 75% and 85% yield. Usually the Heroin produced by the latter contains by-products resulting from the incomplete chemical reactions and due to the extraneous "acetyl groupings" emit a very pungent odor similar to, but more pronounced than, vinegar. Further, their product lacks the pharmaceutical elegance of commercial Heroin.

Due to its profound addictive liabilities in small doses, Heroin is condusive to unlimited dilutions with other components. Because of this flexibility, the peddler dilutes his supply with equal part of lactose, mannose or mannitol, then adds adulterants such as quinine, procaine, acetophenetidin or caffeine to enhance the bitter taste of the mixture and conceal the lack of real Heroin. It frequently reaches the final user containing no more than 5% of actual diacetylmorphine. However, the quantitative determination of Heroin in a seizure does not affect the criminal liability.

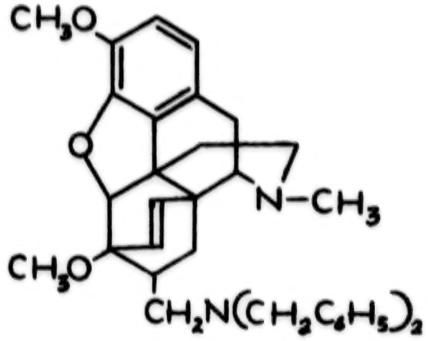
Some traffickers will add food coloring to their Heroin as an identifying trade mark. Generally the color of Heroin is indicative of its purity. The Mexican, or so-called "brown heroin," contains quantities of unacetylated mrophine, monacetylmorphine and some benzylisoquinoline alkaloids such as papaverine, narceine, etc. Since no chemical reaction goes to 100% completion, brown Heroin is always the product of the illicit laboratory that uses crude equipment, contaminated reagents, weak anhydrides or impure morphine. The

techniques employed are generally crude and this tends to restrict the degree of refinement of the final product. Additionally, brown heroin also contains quantities of extraneous acetyl groupings thus causing a foul and disagreeable odor. White Heroin on the other hand is usually of a higher purity because of the additional washings, precipitations, etc. An experienced chemist in an illicit laboratory using modern equipment, pure reagents and bases could produce a quality grade of white Heroin.

The usual method for producing Heroin is to use acetic anhydride or acetyl chloride. However, Heroin can be made very easily by using glacial acetic acid (concentrated acetic acid). The major difference between the two reactions is the amount of water that is split off during the process. When acetic anhydride or acetyl chloride is combined with morphine only one mole of water is split; whereas, when glacial acetic acid is combined with morphine two moles of water are split off. This water tends to reverse the reaction and reduce yields. However, by adding sodium acetate or any other effective drying agent, this water is eliminated and the resulting product is as concentrated and pure as that made by using acetic anhydride. The acetic anhydride-morphine reaction produces diacetylmorphine plus acetic acid.

Heroin can be made also by reacting propionic anhydrides (methyl acetic anhydrides) with morphine or reacting it with constant boiling hydrochloric acid and any effective dehydrating acid along with sulfuric acid. However since acetic anhydride is by far the most important of the organic acid anhydrides its anhydrous properties make it the acetylating agent of choice for synthesizing diacetylmorphine.

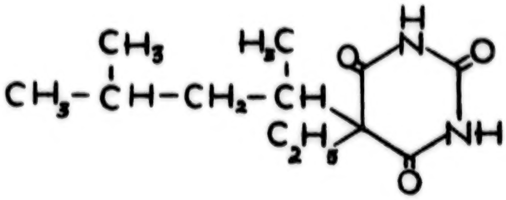
18. 7-DIBENZYLAMINOMETHYL-6, 14-ENDO-ETHENO-TETRAHYDROTHEBAINE
M-4125; Schedule I; No CSA Code assigned; Import/Export permits required.



$C_{36}H_{40}N_2O_3$

Molecular weight - 548.70

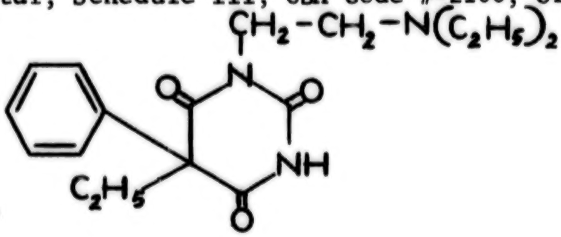
19. DIBERAL
5-(1-dimethylaminobutyl)-5-ethylbarbituric acid; Schedule III; CSA Code #-2100; Form 236.



$C_{12}H_{20}N_2O_3$

Molecular weight - 209.98

20. 1-(2-DIETHYLAMINOETHYL)-5-ETHYL-5-PHENYLBARBITURIC ACID
Diethylaminophenobarbital; Schedule III; CSA Code #-2100; Oral Rx; Form 236.

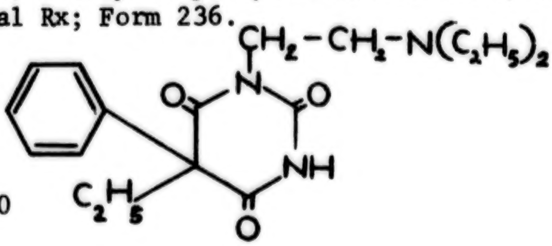


$C_{18}H_{25}N_3O_3$

Molecular weight - 331.40

HCL Salt - Percentage of anhydrous base - 90.07

21. DIETHYLAMINOPHENOBARBITAL
1-(2-diethylaminoethyl)-5-ethyl-5-phenylbarbituric acid; Schedule III; CSA Code #-2100; oral Rx; Form 236.



$C_{18}H_{25}N_3O_3$

Molecular weight - 331.40

HCL Salt - Percentage of anhydrous base - 90.07

SYNTHESIS OF DIACETYLMORPHINE
(HEROIN)

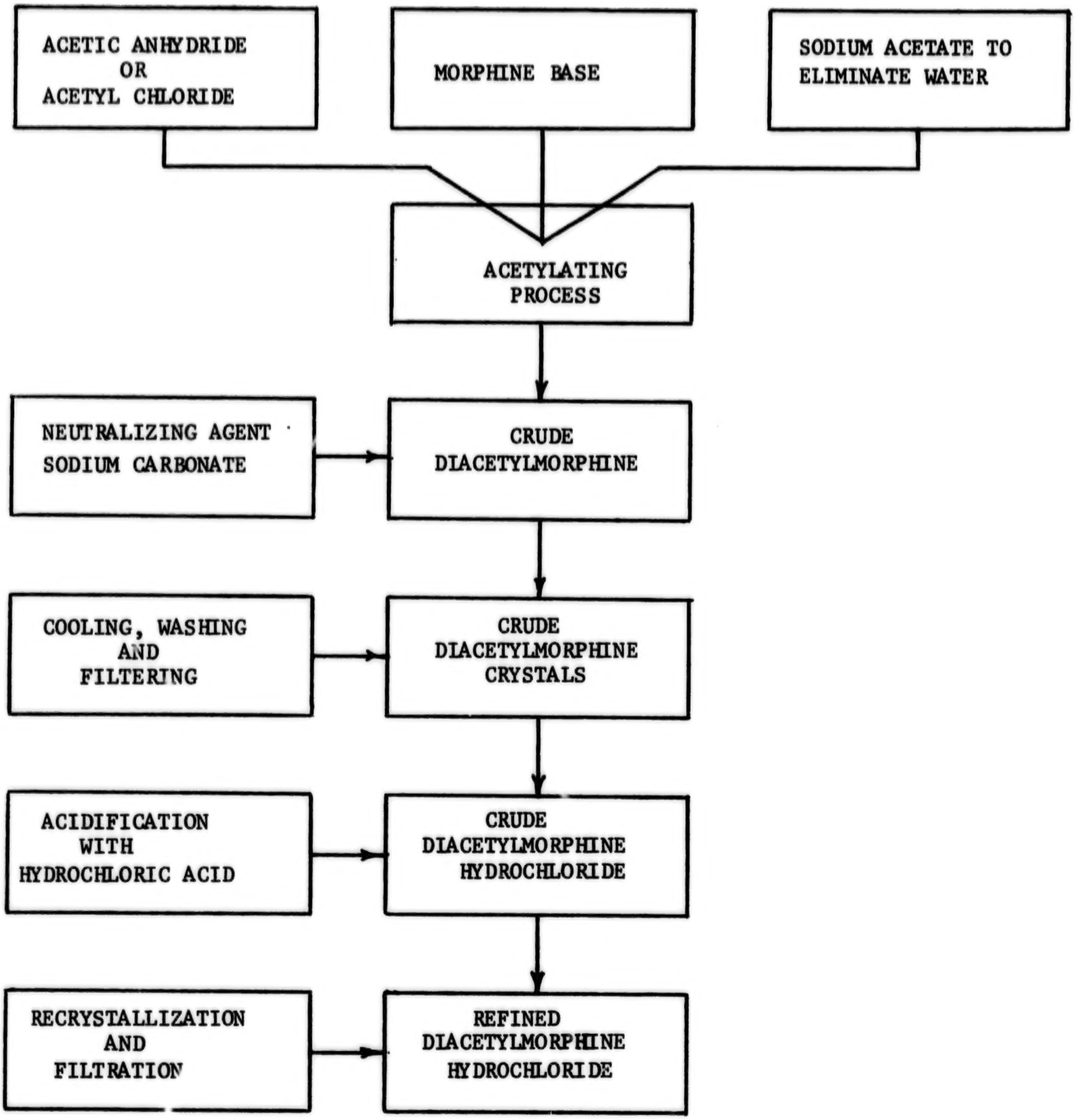


PLATE NO. 3

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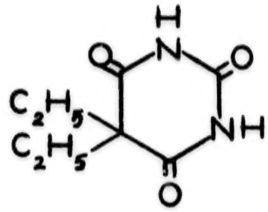
22. 5,5-DIETHYLBARBITURIC ACID
Barbital, Barbitone; Codeonal; Malonal; Veronal; Schedule III; CSA Code #-2145; oral Rx; Form 236

$C_8H_{12}N_2O_3$

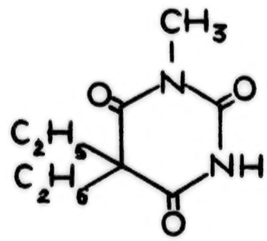


Molecular weight - 184.19

Na Salt - Percentage of anhydrous base - 89.90

23. 5,5-DIETHYL-1-METHYL BARBITURIC ACID
Metharbital; Schedule III; CSA Code #-2100; oral Rx; Form 236.

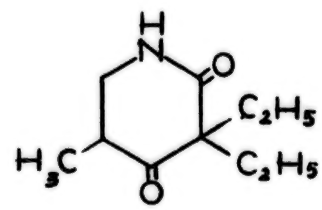
$C_9H_{14}N_2O_3$



Molecular weight - 197.98

24. 3,3-DIETHYL-5-METHYL-2, 4-PIPERIDINEDIONE
Methylprylon; Nodular, (Roche); Schedule III; oral Rx; CSA Code #-2575; Form 236.

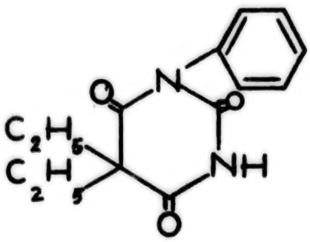
$C_{10}H_{17}NO_2$



Molecular weight - 183.25

26. 5,5-DIETHYL-1-PHENYLBARBITURIC ACID
Phenetharbital; Phetharbital; Schedule III; CSA Code #-2100; oral Rx; Form 236.

$C_{14}H_{16}N_2O_3$

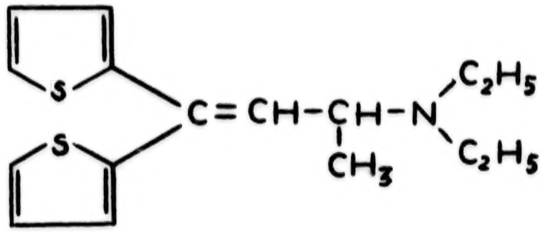


Molecular weight - 260.28

26. DIETHYLTHIAMBUTENE
Diethibutin; Themalon; Diethyl (ambutene); 3-diethylamino-1, 1-di (thienyl)-1-butene; Schedule I; CSA Code #-9616; Import/Export permits required.

$C_{16}H_{21}NS_2$

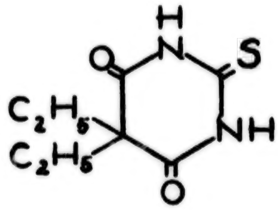
Molecular weight - 291.24



27. 5,5-DIETHYL-2-THIOBARBITURIC ACID
Thiobarbital; Schedule III; CSA Code #-2100; Form 236.

$C_8H_{12}N_2O_2S$

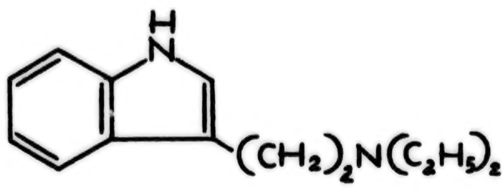
Molecular weight - 200.36



28. DIETHYLTRYPTAMINE
3-(2-DIETHYLAMINO-ethyl)indole; DET; T-9; Schedule I; hallucinogenic substance; CSA Code #-7434; Import/Export permits required.

$C_{14}H_{20}N_2$

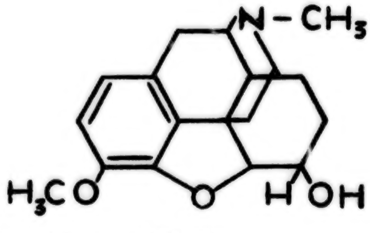
Molecular weight - 216.33



29. DIHYDROCODEINE
Drocode; Parzone; Rapacodin; Schedule II; CSA Code #-9120; written Rx; Import/Export permits required.

$C_{18}H_{23}NO_3$

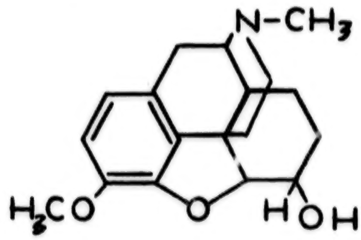
Molecular weight - 301.37



Bitartrate Salt - Percentage of anhydrous base - 66.76

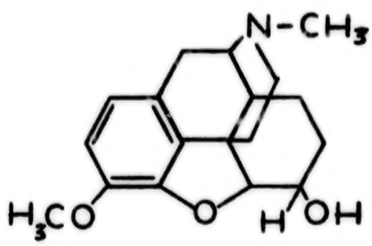
30. DIHYDROCODEINE

Not more than 1.8 grams of dihydrocodeine per 100 milliliters (8.2 grains per 29.573 cc) or not more than 90 milligrams per dosage unit, with one or more active, non-narcotic ingredients in recognized therapeutic amounts. Schedule III; oral Rx; CSA Code #-9807; Import/Export permits required.



31. DIHYDROCODEINE

Not more than 100 milligrams of dihydrocodeine per 100 grams; Schedule V; OTC; CSA Code #-9121; Form 236.

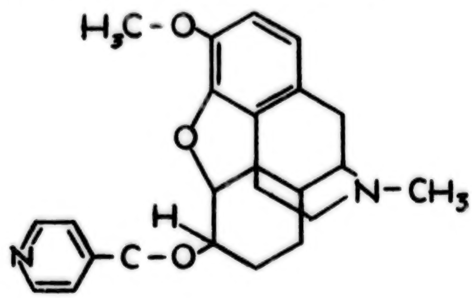


32. DIHYDROCODEINE NOCOTINIC ACID ESTER

Nicodicodine; 6-nicotinyldihydrocodeine; N I.H.8238; a codeine derivative; Schedule I; CSA Code #-9103; Import/Export permits required.

$C_{24}H_{26}N_2O_4$

Molecular weight - 406.46



33. DIHYDROCODEINONE

Hydrocodone; a morphine derivative; Schedule II; CSA Code #-9193; written Rx; Import/Export permits required. See Hydrocodone for Schedule III preparations.

$C_{18}H_{21}NO_3$

Molecular weight - 299.36

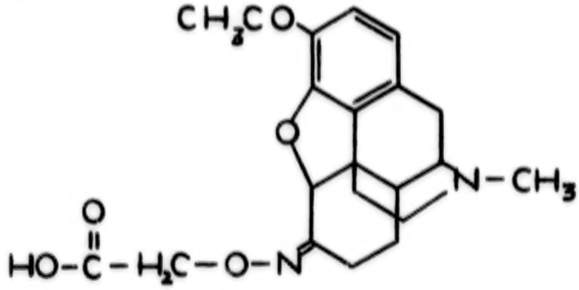
Bitartrate Salt - Percentage of anhydrous base - 61.00

HCL Salt - Percentage of anhydrous base - 81.00

34. DIHYDROCODEINONE-6-CARBOXYMETHYLOXIME
Codoxime; [7],7a,8,9-tetrahydro-3-methoxy-12-methyl-4aH-8,9c-iminoethanophen anthro-/4,5-bcd/furan-5-(6H-ylidene)amino/ acetic acid; Schedule I; CSA Code #-9102.

$C_{20}H_{24}N_2O_5$

Molecular weight - 372.41

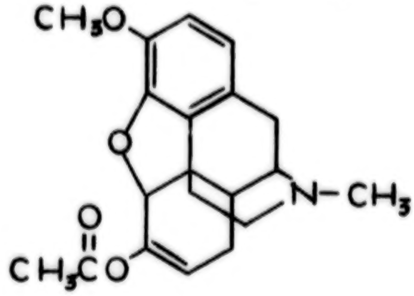


35. DIHYDROCODEINONE enol ACETATE
Acetyldihydrocodeinone; acetyldemethyl-dihydrothebaine; Thebacon; Hydrochloride Salt-Acedicon; Schedule I; CSA Code #-9315; Import/Export permits required. Listed in Schedule I(b) of the C.S.A. by the trade name, Thebacon.

$C_{20}H_{23}NO_4$

Molecular weight - 341.39

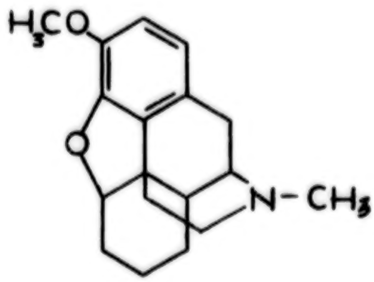
HCL - Percentage of anhydrous base - 90.00



36. DIHYDRODESOXYCODEINE-D
Desocodeine; Schedule I; No CSA Code assigned; Import/Export permits required.

$C_{18}H_{20}NO_2$

Molecular weight - 284.37

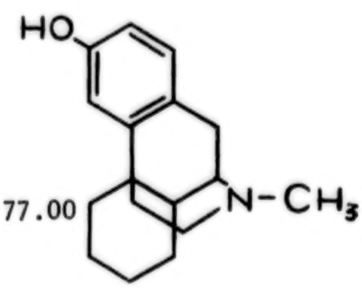


37. DIHYDRODESOXYMORPHINE-D
Desomorphine; 6-methyl-6-desoxymorphine; methyl desomorphine; Schedule I; CSA Code #-9055; Import/Export permits required.

$C_{17}H_{21}NO_2$

Molecular weight - 271.35

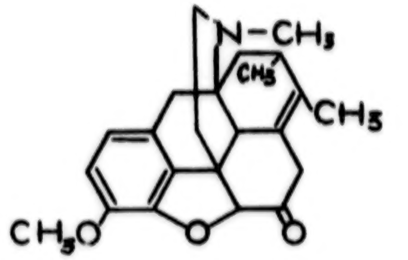
Hydrobromide - Percent of anhydrous base - 77.00



38. 7,8-DIHYDRO-5, '6'-DIMETHYLCYCLOHEX-5'-ENO[1',2':8,14] CODEINONE
M-336; CL-108,476; a thebaine derivative; Schedule I; No CSA Code assigned; Import/Export permits required.

$C_{24}H_{29}NO_3$

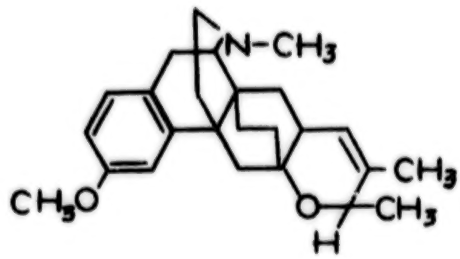
Molecular weight - 379.48



39. 7,8-DIHYDRO-1',5'-DIMETHYL-6, 14-ENDO-ETHANOCYCLOPENTENO (3',2': 6,7) CODIDE
M-6623; a thebaine derivative; No CSA Code assigned; Import/Export permits required.

$C_{25}H_{31}NO_2$

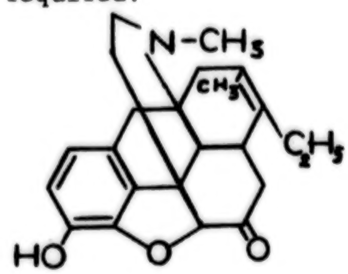
Molecular weight - 377.51



40. 7,8-DIHYDRO-6'-ETHYL-5'-METHYLCYCLOHEX-5'-ENO [1',2':8,14] MORPHINONE
M-355; CL108,475; a thebaine derivative; Schedule I; No CSA Code assigned; Import/Export permits required.

$C_{24}H_{29}NO_3$

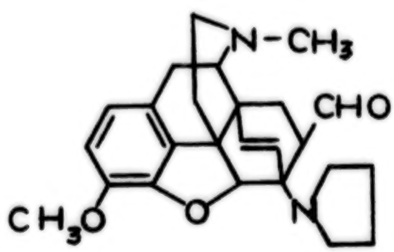
Molecular weight - 379.48



41. 7,8-DIHYDRO-7-FORMYL-6-(1-PYRROLIDINYL)-6,14-ENDO-ETHENOCODIDE
CL-108,487; Schedile I; No CSA Code assigned; Import/Export permits required.

$C_{25}H_{30}N_2O_3$

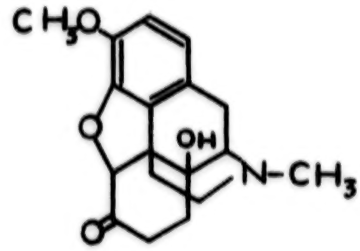
Molecular weight - 406.51



306-877 O - 79 - 8

42. DIHYDROHYDROXYCODEINONE

Oxycodone; a thebaine derivative; 14-hydroxydihydrocodeinone; Eucodal; Schedule II; written Rx; CSA Code #-9143; Import/Export permits required. See Percodan, (ENDO).



$C_{18}H_{21}NO_4$

Molecular weight - 315.36

HCL - Percentage of anhydrous base - 89.64

HCL • $3H_2O$ - Percentage of anhydrous base - 78.00

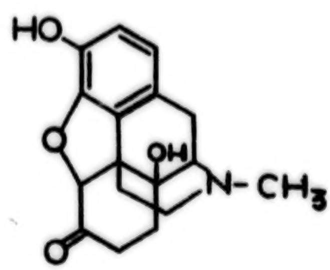
HCL/terephthalate - 88.93

Terephthalate - 79.00

Pectinate - 41.00

43. DIHYDROHYDROXYMORPHINONE

Oxymorphone; Numorphan, (Endo) an oxycodone derivative; Schedule II; written Rx; CSA Code #-9652; Import/Export permits required.



$C_{17}H_{19}NO_4$

Molecular weight - 301.33

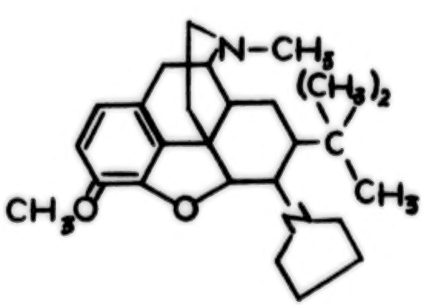
HCL - Percentage of anhydrous base - 85.00

44. 7,8-DIHYDRO-7-(1-HYDROXY-1-METHYLETHYL)-6-(1-PYRROLIDINYL)-6,14-<u>ENDO</u>ETHENO-CODIDE

CL-108,566; a codeinone derivative; Schedule I; No CSA Code assigned; Import/Export permits required.

$C_{27}H_{36}N_2O_3$

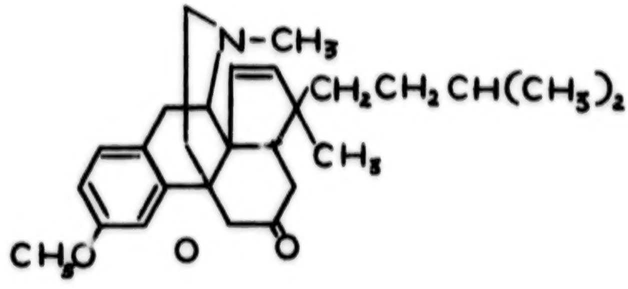
Molecular weight - 436.58



45. 7,8-DIHYDRO-6'-ISO-AMYL-5'-METHYL-CYCLOPENT-5'-ENO[1',2'=8,14]CODEINONE
M-339; Schedule I; No CSA Code assigned; Import/Export permits required.

$C_{27}H_{35}NO_3$

Molecular weight - 421.56

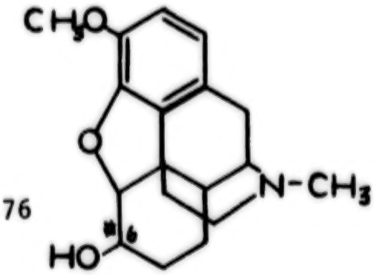


46. DIHYDROISOCODEINE
Schedule I; No CSA Code assigned; Import/Export permits required; An epimer of dihydrocodeine at position No. 6.

$C_{18}H_{23}NO_3$

Molecular weight - 301.38

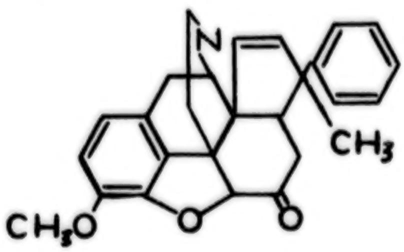
Bitartrate - Percentage of anhydrous base - 66.76



47. 7,8-DIHYDRO-5', METHYL-5'-PHENYL CYCLOPENT-3-ENO[1'2':8,14]CODEINONE
M-358; a thebaine derivative; Schedule I; No CSA Code assigned; Import/Export permits required.

$C_{28}H_{29}NO_3 \cdot \frac{1}{2}H_2O$

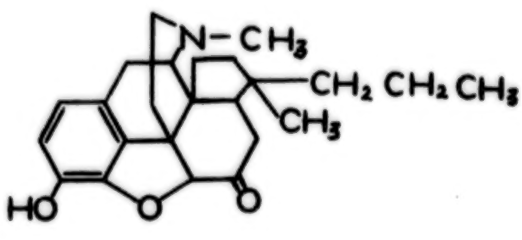
Molecular weight - 436.5



48. 7,8-DIHYDRO-5'-METHYL-5'-PROPYL CYCLOPENT-3'-ENO[1',2':8,14]MORPHINONE
M-355; Schedule I; No CSA Code assigned; Import/Export permits required.

$C_{25}H_{31}NO_3$

Molecular weight - 393.51

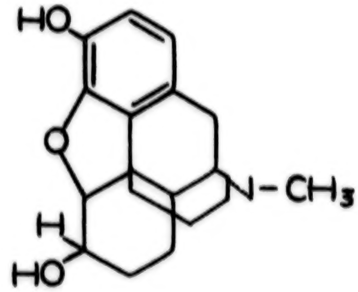


49. DIHYDROMORPHINE
Paramorfan; a by product from the synthesis of dihydromorphinone (Dilaudid), Knoll. Methylated to dihydrocodeine; Schedule I; CSA Code #-9145; Import/Export permits required.

$C_{17}H_{21}NO_3$

Molecular weight - 287.35

HCL - Percent of anhydrous base - 88.74

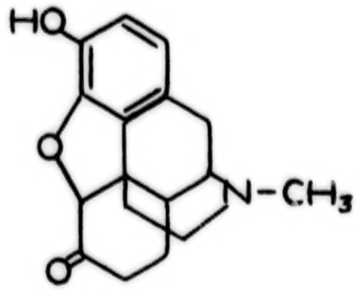


50. DIHYDROMORPHINONE
Hydromorphone; dilaudid, (Knoll); Schedule II; CSA Code #-9194; Import/Export permits required.

$C_{17}H_{19}NO_3$

Molecular weight - 285.33

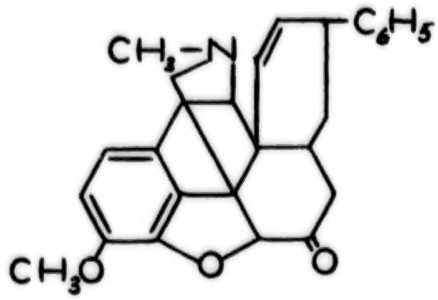
HCL Salt - Percentage of anhydrous base - 88.66



51. 7,8-DIHYDRO-5'-PHENYLCYCLOHEX-4'-ENO-[1', 2':8,14]CODEINONE
M-358, CL108; a thebaine derivative; No CSA Code assigned; Import/Export permits required.

$C_{28}H_{29}NO_3$

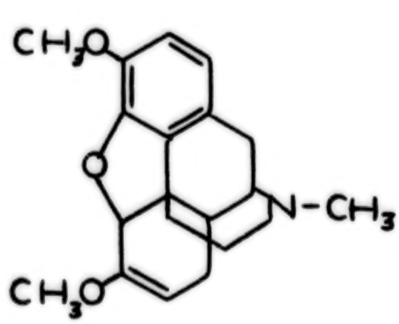
Molecular weight - 427.52



52. DIHYDROTHEBAINE
Schedule I; No CSA Code assigned; Import/Export permits required.

$C_{19}H_{23}NO_3$

Molecular weight - 313.38

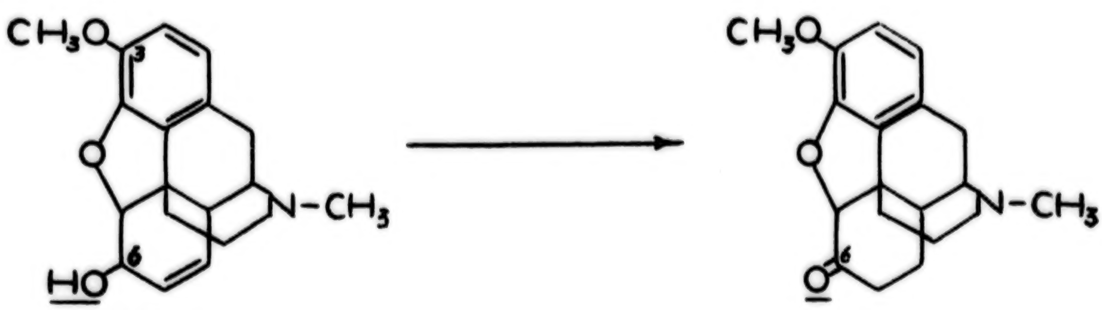


DIHYDROMORPHINONE

Chemically, dihydromorphinone has the same relation to morphine that dihydrocodeinone has to codeine. Dihydromorphinone is distinguished from morphine and dihydrocodeinone from codeine, by the substitution of a ketone group in place of the alcoholic hydroxy group at position number six.

This relationship is more apparent in their graphic formulae.

MORPHINE — DIHYDROMORPHINONE



CODEINE — DIHYDROCODEINONE

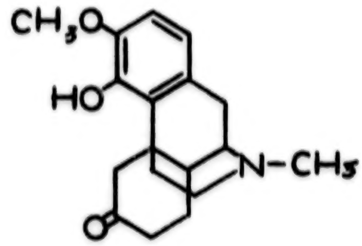
Comparing the structural formular of morphine to dihydromorphinone, it is surprising to see how large a difference in pharmacologic effect can be produced by a slight difference in the make up of the molecule. Dihydromorphinone is reduced from morphine by a catalytical agent which produces hydration. The hydroxy group (OH) on position 6 is converted to an oxygen (o), and the adjacent unsaturated double bonds are satisfied with a hydrogen (H). This change increases the analgesic effect of the compound approximately five times that of morphine.

53. DIHYDROTHEBAINONE

Schedule I; No CSA Code assigned; Import/Export permits required. Bromination and recyclization gives dihydrocodeinone.

$C_{18}H_{19}NO_3$

Molecular weight - 297.15

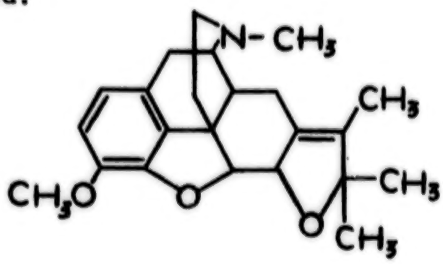


54. 7,8,-DIHYDRO-1',5',5'-TRIMETHYL-6, 14-ENDO ETHANOCYCLOPENTENO (3; 2': 6,7) CODIDE

M-6625; a thebaine derivative; Schedule I; No CSA Code assigned; Import/Export permits required.

$C_{26}H_{33}NO_2$

Molecular weight - 391.54

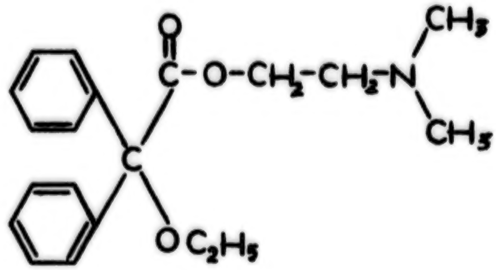


55. DIMENOXADOL

N.I.H.-7577; Lokarin; dimethylaminoethyl-1-ethoxy-1, diphenyl acetate or dimethylaminoethyl diphenyl-a-ethoxyacetate; Schedule I; CSA Code #-9617.

$C_{20}H_{25}NO_3$

Molecular weight - 327.43



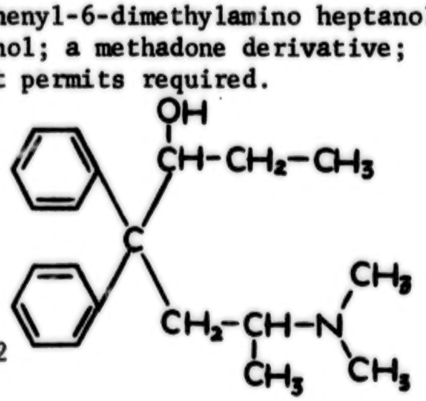
56. DIMEPHEPTANOL

Amidol, methadol; N.I.H.-2933; 4,4-diphenyl-6-dimethylamino heptanol -3; 6-dimethylamino-4, 4-diphenyl-3-heptanol; a methadone derivative; Schedule I; CSA Code #-9618; Import/Export permits required.

$C_{21}H_{29}NO$

Molecular weight - 311.45

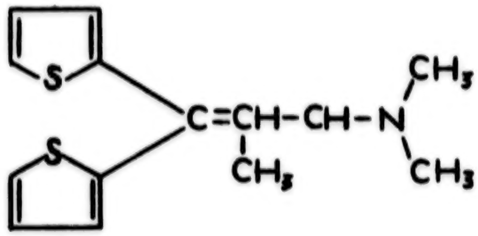
HCL - Percentage of anhydrous base - 89.52



57. DIMETHIBUTIN
Dimethylthiambutene; Aminobutene; N.I.H.-4542; 3-dimethylamino-1,1-di-(2-thienyl)-1-butene; Schedule I; CSA Code #-9619; Import/Export permits required.

$C_{14}H_{17}NS_2$

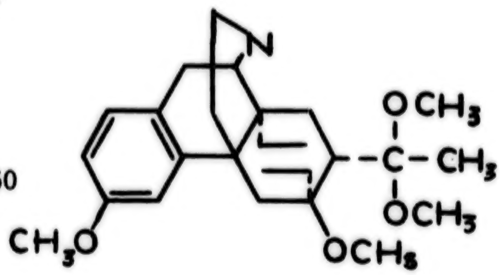
Molecular weight - 263.21



58. 7α-(1,1-DIMETHOXYETHYL)-6,7,8,14-TETRAHYDRO-6,14-ENDO-ETHENONORTHEBAINE
Schedule I; a thebaine derivative; No CSA Code assigned; Import/Export permits required.

$C_{24}H_{31}NO_5$

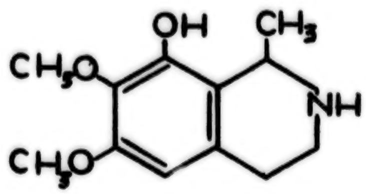
Molecular weight - 413.50



59. 7,8-DIMETHOXY-8-HYDROXY-1-METHYL-1,2,3,4-TETRAHYDROISOQUINOLINE
Anhalonidine; derived from the Peyote plant; 1,2,3,4-tetrahydro-6,7-dimethyoxy-1-methyl-8-isoquinolinol; Schedule I; CSA Code #-7417; Import/Export permits required.

$C_{12}H_{17}NO_3$

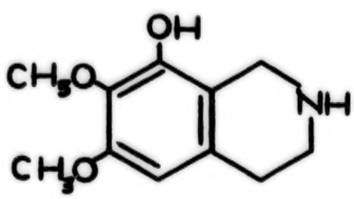
Molecular weight - 223.24



60. 6,7-DIMETHOXY-8 HYDROXY-1,2,3,4- TETRAHYDROISOQUINOLINE
Anhalamine; derived from the Peyote plant; Schedule I; CSA Code #-7416; Import/Export permits required.

$C_{11}H_{15}NO_3$

Molecular weight - 209.24

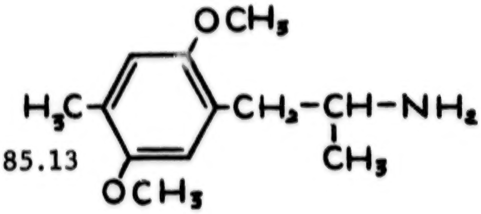


61. 2,5-DIMETHOXY-4-METHYLAMPHETAMINE
A phenethylamine derivative; STP; DOM; Schedule I; CSA Code #-7395; Import/Export permits required.

$C_{12}H_{19}O_2N$

Molecular weight - 209.11

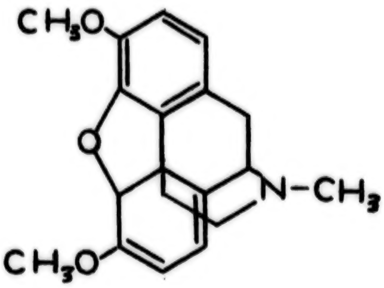
HCL - Percentage of anhydrous base - 85.13



62. 2,12-DIMETHOXY-N-METHYL-1, 11-EPOXYMORPHINENE
Thebaine; a principal phenanthrene alkaloid of opium; Paramorphine; Schedule II; without medical utility as such; CSA Code #-9333; Import/Export permits required.

$C_{19}H_{21}NO_3$

Molecular weight - 311.17

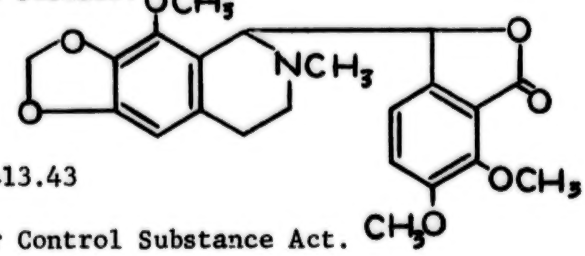


63. 6,7-DIMETHOXY-3-(5,6,7,8-TETRAHYDRO-4-METHOXY-6-METHYL-1,3-DIOXOLO/4,5-g/ ISOQUINOLIN-5-YL)PHTHALIDE
Noscapine; a benzylisoquinoline alkaloid of opium; present in ratios of 5-6%. Used primarily as an antitussive agent in form of its salts-HCL, Picrolonate and Sulfate.

$C_{22}H_{23}NO_7$

Molecular weight - 413.43

Not controlled under Control Substance Act.

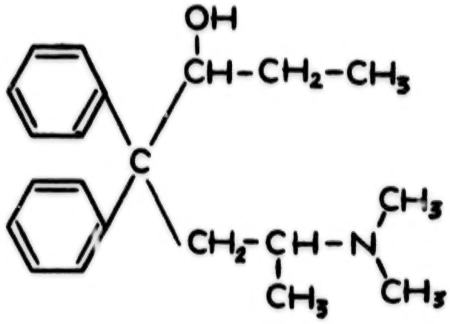


64. 6-DIMETHYLAMINO-4, 4-DIPHENYL-3-HEPTANOL
Amidol; dimepheptanol; methadol; N.I.H.2933; 4,4-diphenyl-6-dimethylaminoneptanol-3; Schedule I; CSA Code #-9618; Import/Export permits required.

$C_{21}H_{29}NO$

Molecular weight - 311.45

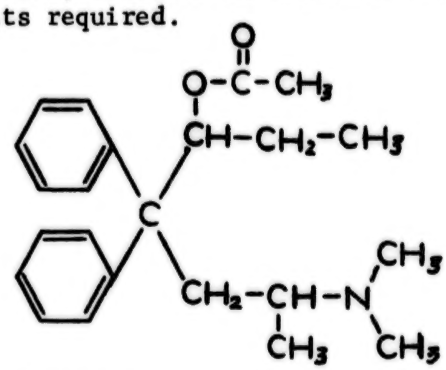
HCL - Percentage of anhydrous base - 89.52



65. 6-DIMETHYLAMINO-4, 4-DIPHENYL-3-HEPTANOL ACETATE
4,4-diphenyl-6-dimethylamine-3-acetoxy-heptane; 6-dimethylamine-4, 4-diphenyl-3-acetoxy-heptane; acetylmethadol; acemethadone; amidolacetate; race-acetylmethadol; methadylacetate; Schedule I; Research only; CSA Code #-9601; Import/Export permits required.

$C_{23}H_{31}NO_2$

Molecular weight - 353.49



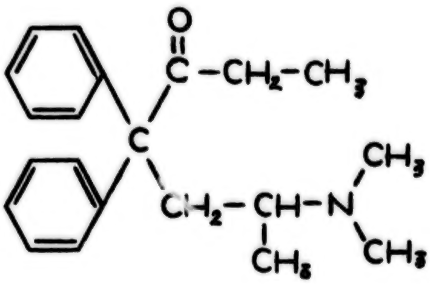
66. 6-DIMETHYLAMINO-4, 4-DIPHENYL-3-HEPTANONE
4,4-diphenyl-6-dimethylaminoheptanone; methadone; Adanon, (Winthrop); Dolophine, (Lilly); Methajade, (M.S.& D.); Physeptone,(B.W); Schedule II; CSA Code #-9250; Import/Export permits required.

$C_{21}H_{27}NO$

Molecular weight - 309.20

Bitartrate Salt - 67.00

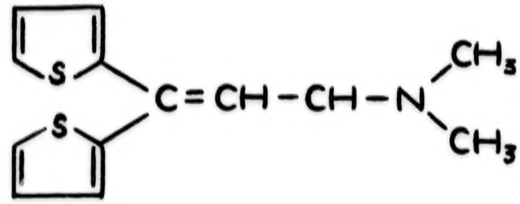
HCL Salt - 90.00



67. 3-DIMETHYLAMINO-1, 1-DI-(2-THIENYL)-1-BUTENE
Dimethylthiambutene; aminobutene; dimethibutin; N.I.H.4542; Schedule I; CSA Code #-9619; Import/Export permits required.

$C_{14}H_{17}NS_2$

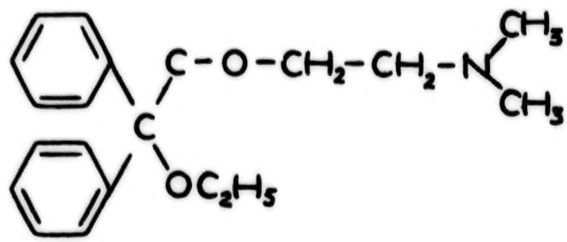
Molecular weight - 236.21



68. DIMETHYLAMINOETHYL-1-ETHOXY-1, DIPHENYL-ACETATE
Dimenoxadol; N.I.H.-7577; Loakrin; dimethylaminoethyl diphenyl-1-ethoxyacetate; Schedule I; CSA Code #-9617; Import/Export permits required.

$C_{20}H_{25}NO_3$

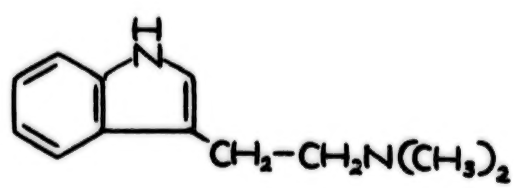
Molecular weight - 327.43



69. 3-(DIMETHYLAMINO ETHYL)INDO-5-OL
N, N-dimethylserotonin-5-hydroxy-N-dimethyltryptamine; Bufotenine; Schedule I; hallucinagenic substance; CSA Code #-7433; Import/Export permits required.

$C_{12}H_{16}N_2O$

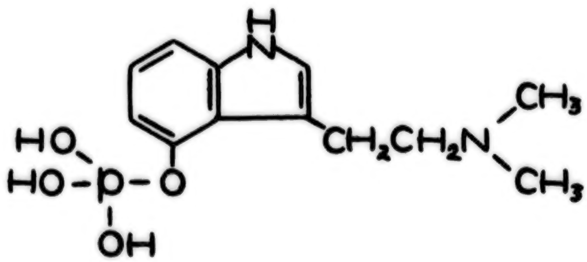
Molecular weight - 204.26



70. 3-[2-(DIMETHYLAMINO)ETHYL]INDOLE-4-OL DIHYDROGEN PHOSPHATE ESTER
Psilocybin; Psilotsibin Indocybin; From the Fungus, Psilocybe mexicana; an hallucinagenic substance; Schedule I; CSA Code #-7437; Import/Export permits required.

$C_{12}H_{17}N_2O_4P$

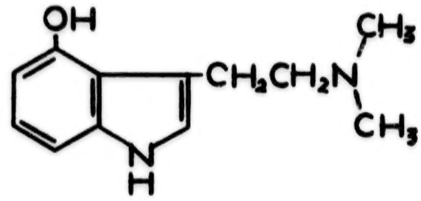
Molecular weight - 284.27



71. 3[2-(DIMETHYLAMINO)ETHYL]INDOL-4-OL PSILOTSIN
C x 59; an hallucinogenic substance from the fungus Psilocybe mexicana; Schedule I; CSA Code #-7438; Import/Export permits required.

$C_{12}H_{15}ON_2$

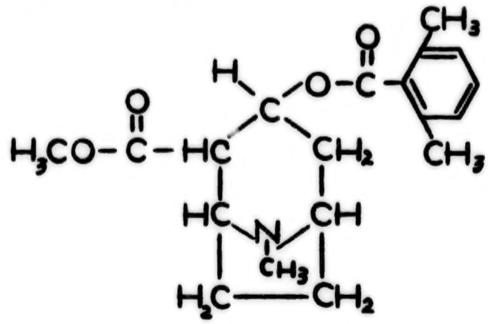
Molecular weight - 203.27



72. 2,6-DIMETHYLBENZOYLECGONINE METHYL ESTER
Ecgonine 2,6-dimethylbenzoyl methylester; an ester of ecgonine; Schedule II; without medical utility; CSA Code #-9184; Import/Export permits required.

$C_{19}H_{25}NO_4$

Molecular weight - 333.10

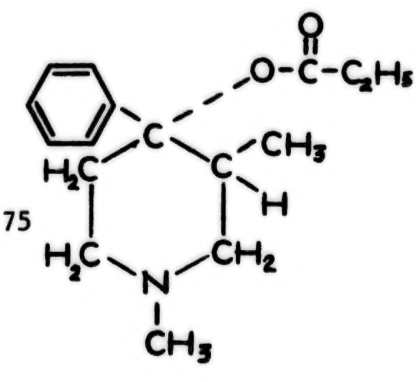


73. DL-1,3-DIMETHYL-4-PHENYL-4-PIPERIDINOL PROPIONATE
Alphaprodine; alpha-1,3-dimethyl-4-phenyl-4-pripionoxypiperidine; Nisentil-Roche's brand of alphaprodine hydrochloride. A synthetic pethidine derivative of rapid but short duration; ampoules; Schedule II; written Rx; CSA Code #-9010; Import/Export permits required.

$C_{16}H_{23}NO_2$

Molecular weight - 261.36

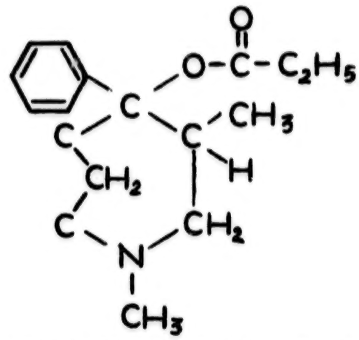
HCL - Percentage of anhydrous base - 87.75



74. 1,3-DIMETHYL-4-PHENYL-4-PRIPIONOXY-HEXAMETHYLENEIMINE
Proheptazine; Proheptazone; Schedule I; CSA Code #-9642; Import/Export permits required.

$C_{17}H_{25}NO_2$

Molecular weight - 275.38

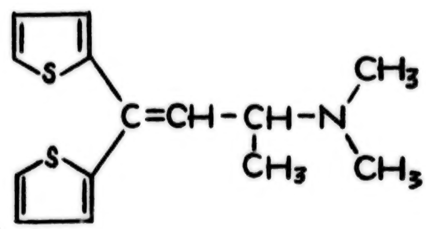


75. DIMETHYLTHIAMBUTENE
Aminobutene; Dimethibutin; N.I.H.-4542; 3-dimethylamino-1, 1-di-(2-thienyl)-1-butene; Schedule I; CSA Code #-9619; Import/Export permits required.

$C_{14}H_{17}NS_2$

Molecular weight - 263.21

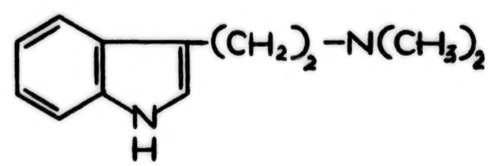
HCL - Percent of anhydrous base - 87.83



76. DIMETHYLTRYPTAMINE
N, N-DIMETHYLTRYPTAMINE; DMT; 2-[2(dimethylamino)ethyl]idole; Schedule I; hallucinogenic substance; CSA Code #-7435; Import/Export permits required.

$C_{12}H_{16}N_2$

Molecular weight - 188.26

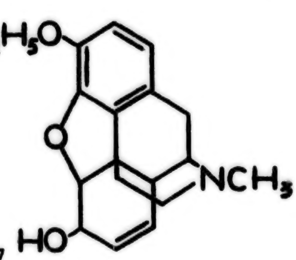


77. DIONIN
Ethylmorphine; Schedule II; CSA Code #-9190; written Rx; Import/Export permits required. See Ethylmorphine for Schedule III and Schedule V preparations.

$C_{19}H_{21}NO_3$

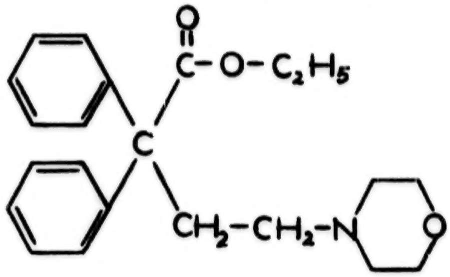
Molecular weight - 313.38

HCL - Percentage of anhydrous base - 81.47



78. DIOXAPHETYL BUTYRATE

Amidalgon; Spasmoxale; ethyl 2, a-diphenyl-4-morpholinobutyrate; a methadone derivative; Schedule I; CSA Code #-9621; Import/Export permits required.

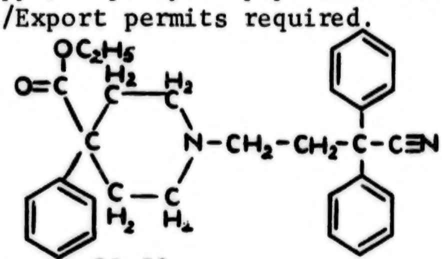


$C_{22}H_{27}NO_3$

Molecular weight - 353.44

79. DIPHENOXYLATE

Ethyl 1-(3 cyano-3, 3-diphenylpropyl)-4-phenyl-4-piperidine carboxylate; Schedule II; CSA Code #-9170; Import/Export permits required.



$C_{30}H_{32}N_2O_2$

Molecular weight - 452.60

HCL Salt - Percentage of anhydrous base - 92.50

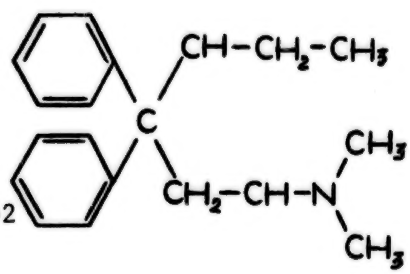
80. DIPHENOXYLATE

Not more than 2.5 milligrams of diphenoxylate and not less than 25 micrograms of atropine sulfate per dosage unit; Schedule V; CSA Code #-9171; Oral Rx; Form 236.

See Code of Federal Regulations-Title 21, Part 308, Section 308.15.

81. 4,4-DIPHENYL-6-DIMETHYLAMINOHEPTANOL-3

Amidol; dimepheptanol; methadol; N.I.H.-2933; 6-dimethylamino-4,4-diphenyl-3-heptanol; a methadone derivative; Schedule I; CSA Code #-9618; Import/Export permits required.



$C_{21}H_{29}NO$

Molecular weight - 311.45

HCL - Percentage of anhydrous base - 89.52

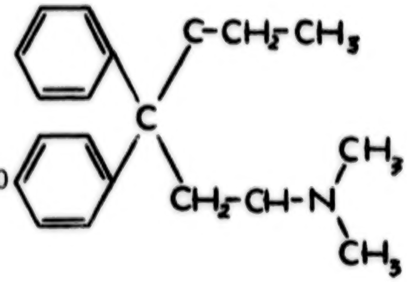
82. 4,4-DIPHENYL-6-DIMETHYLAMINOHEPTANONE
1,1-diphenyl-1-(2-dimethylaminopropyl)-3-heptanone. Adanon (Winthrop); Dolophine (Lilly); Methajade (MS&D); Physeptone (B.W.); Methadone; Schedule II; written Rx; CSA Code #-9250; Import/Export permits required.

$C_{21}H_{27}NO$

Molecular weight - 309.20

Bitartrate - Percentage of anhydrous base - 67.00

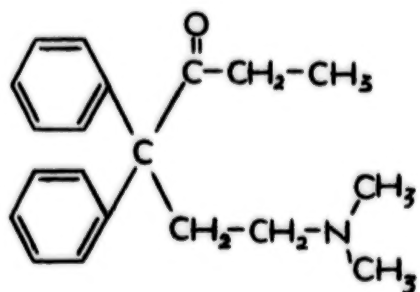
HCL - Percentage of anhydrous base - 90.00



83. 4,4-DIPHENYL-6-DIMETHYLAMINO-3-HEXANONE
Normethadone; Deatussin; Mepidon; Normedon; Phenyl-diamazone; Ticarda; Veryl; Schedule I; CSA Code #-9635; Import/Export permits required.

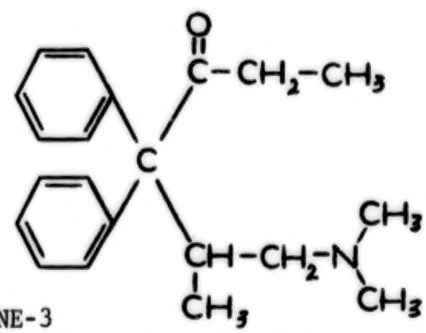
$C_{20}H_{25}NO$

Molecular weight - 295.40



84. 4,4-DIPHENYL-5-METHYL-6-DIMETHYLAMIHOHEXANONE-3
Isomethadone; Isoadanon; Isoamidone; 6-dimethylamino-5-methyl-4, 4-diphenyl-3-hexanone; Schedule I; CSA Code #-9226.

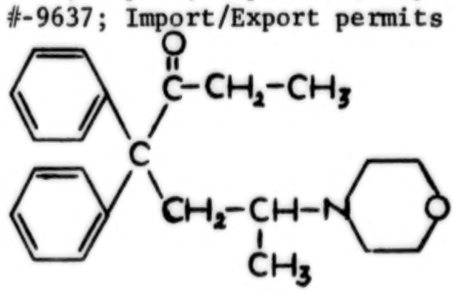
Molecular weight - 309.20



85. 4,4-DIPHENYL-6-MORPHOLINO-HEPTANONE-3
CB-11; Hepagin; Heptalgin; Heptalin; Heptan; Heptazone; Heptone; Phenadoxone; Schedule I; CSA Code #-9637; Import/Export permits required.

$C_{23}H_{29}NO$

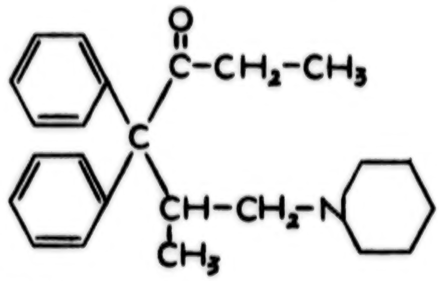
Molecular weight - 335.47



86. 4,4-DIPHENYL-6-PIPERIDINO-3-HEPTANONE
Dipipanone; pipadone; piperidylmethadone; a methadone derivative; Schedule I; CSA Code #-9622; Import/Export permits required.

$C_{24}H_{31}NO$

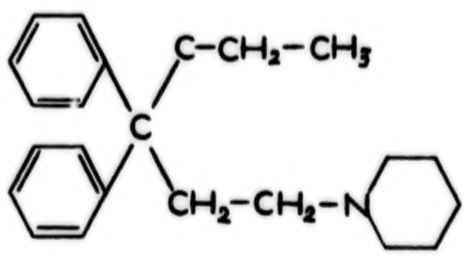
Molecular weight - 349.25



87. 4,4-DIPHENYL-6-PIPERIDINO-3-HEXANONE
Hexalgon; Norpipanone, Schedule I; CSA Code #-9636; Import/Export permits required.

$C_{23}H_{29}NO$

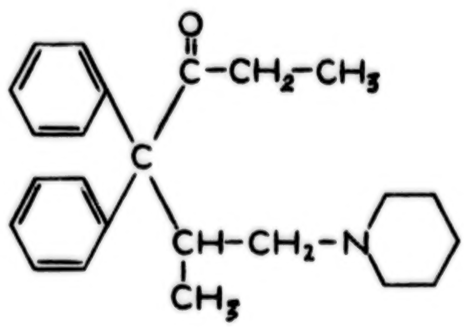
Molecular weight - 335.47



88. DIPIPANONE
Pipadone; piperidylmethadone; 4,4-diphenyl-6-piperidino-3-heptanone; a methadone derivative; Schedule I; CSA Code #-9622; Import/Export permits required.

$C_{24}H_{31}NO$

Molecular weight - 349.25

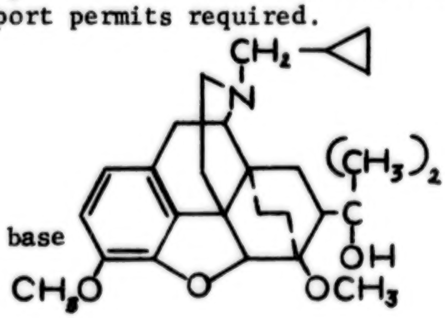


89. DIPRENORPHINE
N-Cyclopropylmethyl-7 alpha-(1-hydroxy-1-methylethyl)-6,7,8,14-tetrahydro-6,14-endo ethanonororipavine; M-5050; a thebaine derivative; narcotic antagonist-not subject to international controls; Schedule II; CSA Code #-9058; Import/Export permits required.

$C_{20}H_{29}O_4N$

Molecular weight - 347.16

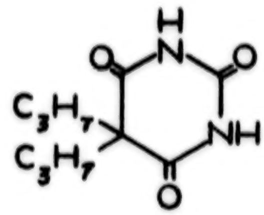
HCL - Percent of anhydrous base 90.51



90. **5,5-DIPROPYLBARBITURIC ACID**
Propylbarbital; Schedule III; CSA Code #-2100; oral Rx; Form 236.

$C_{10}H_{16}N_2O_3$

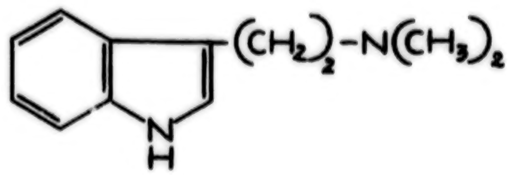
Molecular weight - 211.98



91. DMT
N, N-Dimethyltryptamine; 2-[2(dimethylamino)ethyl]indole; Schedule I; CSA Code #-7435; Import/Export permits required.

$C_{12}H_{16}N_2$

Molecular weight - 188.26

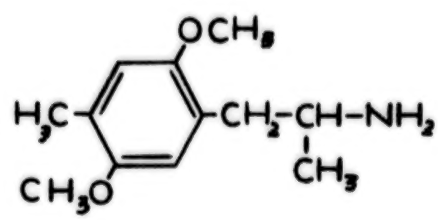


92. DOM
2,5-dimethoxy-4-methylamphetamine; STP; a phenethylamine derivative; Schedule I; CSA Code #-7395; Import/Export permits required.

$C_{12}H_{19}O_2N$

Molecular weight - 209.11

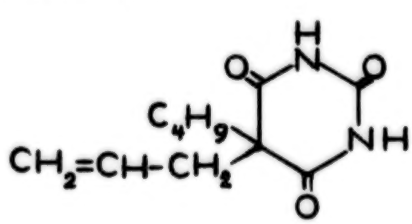
HCL - Percentage of anhydrous base - 85.13



93. DORMUPAX
N-Butylbarbituric acid; 5-allyl-5-n-butylbarbituric acid; Idobutal; Schedule III; CSA Code #-2100; Form 236.

$C_{11}H_{16}N_2O_3$

Molecular weight - 224.25



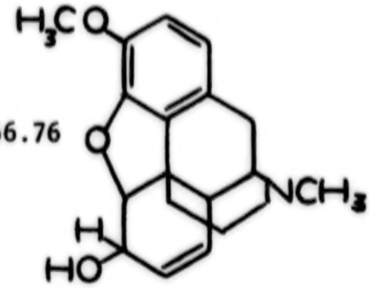
94. **DROCODE**

Dihydrocodeine; Parzone; Rapacodin; Schedule II; CSA Code #-9120; written Rx; Import/Export permits required.

$C_{18}H_{23}NO_3$

Molecular weight - 301.37

Bitartrate Salt - Percentage of anhydrous base - 66.76

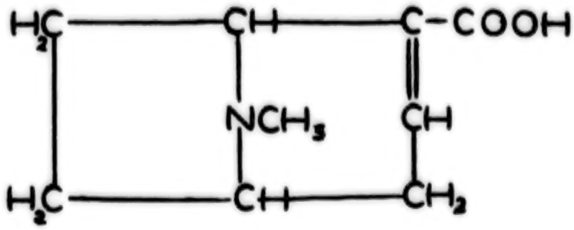


1. **ECGONIDINE**

2-tropidinecarboxylic acid; anhydroecgonine; an ecgonine derivative; Schedule I; No CSA Code assigned; Import/Export permits required.

$C_9H_{13}NO_2$

Molecular weight - 167.20

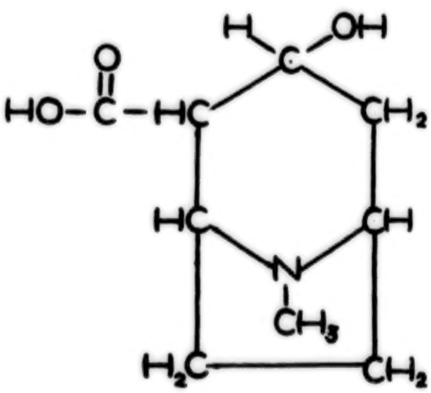


2. **ECGONINE**

3-Beta-hydroxy-2 Beta tropanecarboxylic acid; The principal part of the cocaine molecule. All esters and precursors that are convertible to ecgonine and codeine are controlled; Schedule II; CSA Code #-9180; Import/Export permits required.

$C_9H_{15}NO_3$

Molecular weight - 185.22



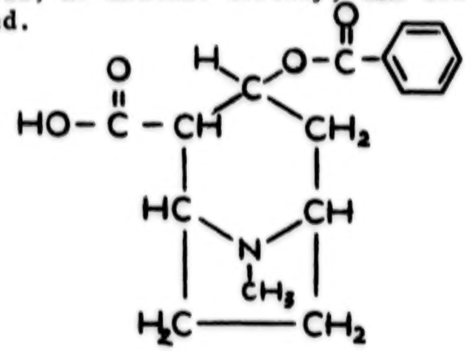
306-877 O - 79 - 9

3. ECGONINE BENZOYLESTER

Benzoylecgonine; Schedule II; No medical utility; CSA Code #-9187; Import/Export permits required.

$C_{16}H_{19}NO_4 \cdot 4H_2O$

Molecular weight - 361.39

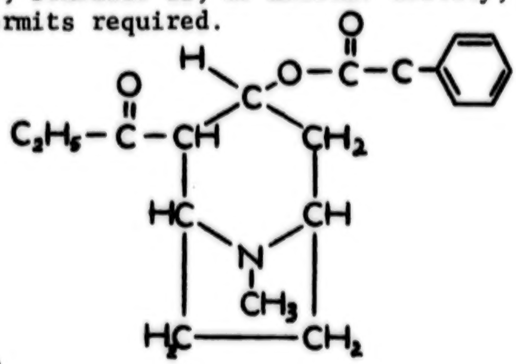


4. ECGONINE BENZOYLETHYLESTER

Benzoylecgonine ethylester; Schedule II; no medical utility; CSA Code #-9181; Import/Export permits required.

$C_{18}H_{23}NO_4$

Molecular weight - 317.37

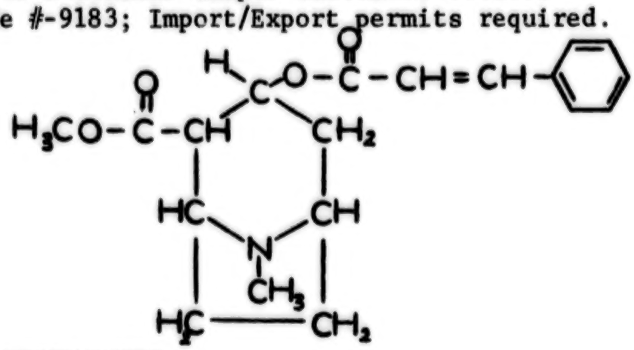


5. ECGONINE CINNAMAYLMETHYLESTER

An ester of ecgonine; cinnamoyl ecgonine methylester; cinnamoylcocaine; a natural occurring alkaloid found in coca. Generally, presents of cinnamoylcocaine in a cocaine sample indicates illicit origin; Schedule II; CSA Code #-9183; Import/Export permits required.

$C_{19}H_{23}NO_4$

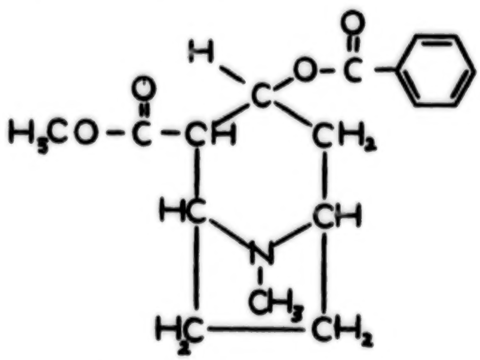
Molecular weight - 329.38



6. ECGONINE 2,6-DIMETHYLBENZOYLMETHYLESTER

an ester of ecgonine; 2,6-dimethylbenzoylecgonine methyl ester; Schedule II; without medical utility; CSA Code #-9184; Import/Export permits required.

Molecular weight - 333.10

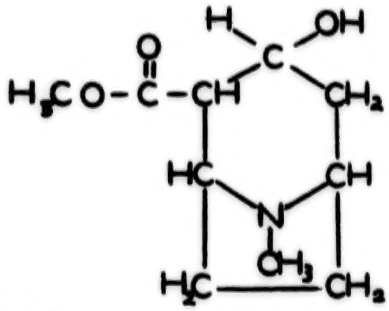


7. ECGONINE METHYLESTER

Schedule II; no medical utility; CSA Code #-9185; Import/Export permits required.

$C_{10}H_{27}NO_3$

Molecular weight - 199.25

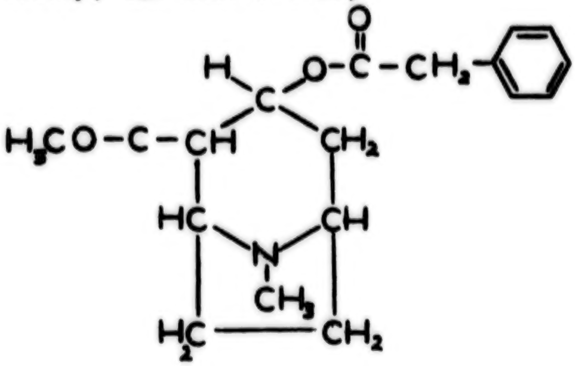


8. ECGONINE PHENYLACETYLMETHYLESTER

Schedule II; no medical utility; CSA Code #-9185;

$C_{18}H_{23}NO_4$

Molecular weight - 361.39

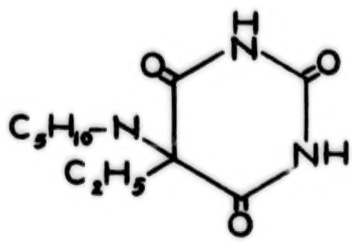


9. ELDORAL

5-ethyl-5-1(1-piperidyl) barbituric acid; Schedule III; CSA Code #-2100; Form 236.

$C_{11}H_{17}N_3O_3$

Molecular weight - 239.26

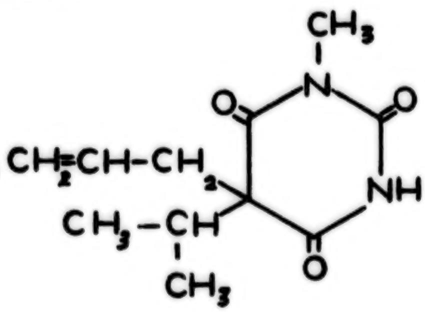


10. ENALLYLPROPYMAL

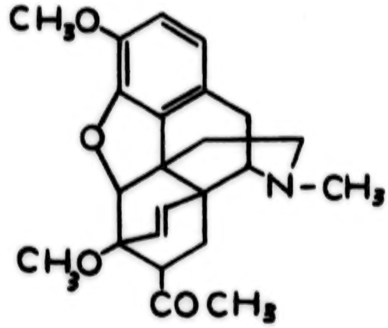
1-methyl-5-allyl-5-isopropylbarbituric acid; Narconumal; Schedule III; CSA Code #-2100; Form 236.

$C_{11}H_{16}N_2O_3$

Molecular weight - 224.25



11. 6,14-<u>ENDO</u>ETHENO-7-ACETYL-TETRAHYDROTHEBAINE
M-39; Schedule I; a thebaine derivative; No CSA Code assigned; Import/Export permits required.



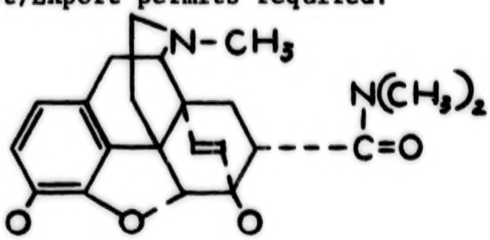
$C_{23}H_{27}NO_4$

Molecular weight - 381.46

HCL - Percentage of anhydrous base - 91.2

HBR - Percentage of anhydrous base - 82.5

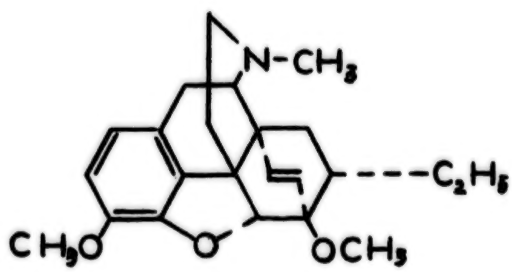
12. 6,14-ENDO-ETHENO-7 ALPHA-DIMETHYLAMINO CARBONYLTETRAHYDROTHEBAINE
Schedule I; No CSA Code assigned; Import/Export permits required.



$C_{24}H_{30}N_2O_4 \cdot H_2O$

Molecular weight - 427.19

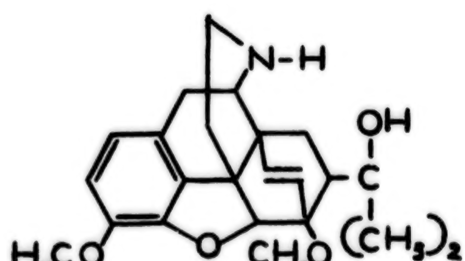
13. 6,14-ENDO-ETHENO-7-ALPHA-ETHYLTETRAHYDROTHEBAINE
Schedule I; a thebaine derivative; No CSA Code assigned; Import/Export permits required.



$C_{23}H_{29}NO_3$

Molecular weight - 366.97

14. 6,14-<u>ENDO</u>ETHENO-7 ALPHA-(2-HYDROXY-2-PROPYL) TETRAHYDRONORTHEBAINE
M-169; a thebaine derivative; Schedule I; No CSA Code assigned; Import/Export permits required.



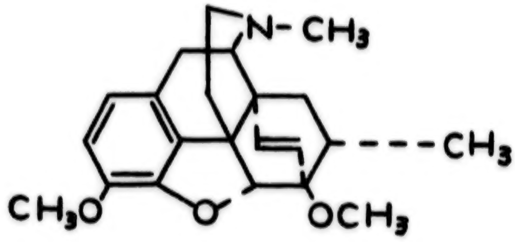
$C_{23}H_{29}NO_4$

Molecular weight - 383.47

15. 6,14-ENDO-ETHENO-7 ALPHA-METHYLTETRAHYDROTHEBAINE
(methylthebaine derivative)

$C_{22}H_{27}NO_3$

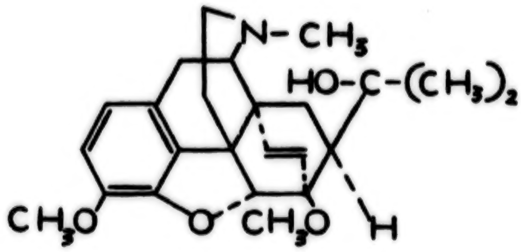
Molecular weight -



16. 6,14-<u>ENDO</u> ETHENO-7BETA-(2-HYDROXY-2-PROPYL)TETRAHYDROTHEBAINE
M-5628; M-50 emiper; a thebaine derivative; Schedule I; No CSA Code assigned.

$C_{24}H_{31}NO_4$

Molecular weight - 397.50

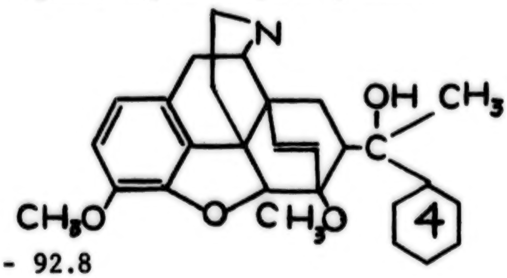


17. 6,14-<u>ENDO</u> ETHENO-7-(1-HYDROXY-1-CYCLOHEXYL-1-ETHYL)TETRAHYDROTHEBAINE
M-56; Schedule I; No CSA Code assigned; Import/Export permits assigned;

$C_{29}H_{39}NO_4$

Molecular weight - 465.61

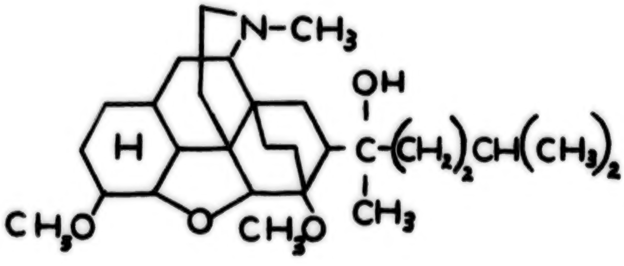
HCL - Percentage of anhydrous base - 92.8



18. 6,14-<u>ENDO</u> ETHANO-7-(2-HYDROXY-5-METHYL-2-HEXYL)DECAHYDROTHEBAINE
M-369; a thebaine derivative; Schedule I; No CSA Code assigned; Import/Export permits required.

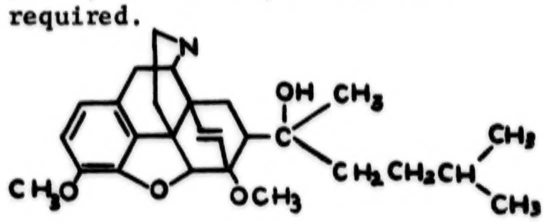
$C_{28}H_{47}NO_4$

Molecular weight - 461.66



19. 6,14-ENDOETHENO-7-(2-HYDROXY-5-METHYL-2-HEXYL)TETRAHYDROTHEBAINE
M-55; M-55A; a thebaine derivative; Schedule I; No CSA Code assigned; Import/Export permits required.

$C_{28}H_{29}NO_4$

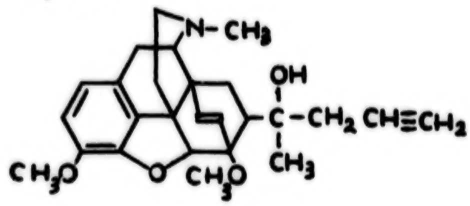


Molecular weight - 443.52

HCL - Percentage of anhydrous base - 92.2

20. 6,14-<u>ENDO</u> ETHENO-7-(2-HYDROXY-4-PENTEN-2-YL)TETRAHYDROTHEBAINE
M-62; M62A; a thebaine derivative; Schedule I; No CSA Code assigned; Import/Export permits required.

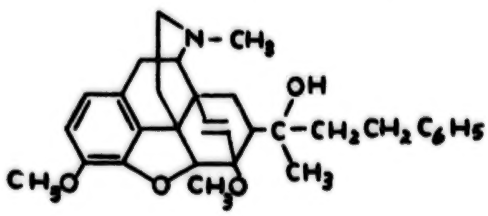
$C_{26}H_{33}NO_4$



Molecular weight - 423.53

21. 6,14-<u>ENDO</u>-ETHENO-7-(2-HYDROXY-4-PHENYL-2-BUTYL)TETRAHYDROTHEBAINE
M-58; a thebaine derivative; Schedule I; No CSA Code assigned; Import/Export permits required.

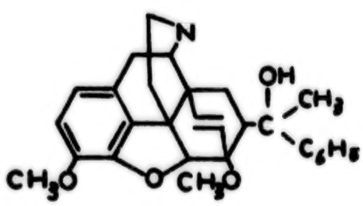
$C_{31}H_{37}NO_4$



Molecular weight - 487.61

22. 6,14-<u>ENDO</u>ETHENO-7-(1-HYDROXY-1-PHENYL-1-ETHYL)TETRAHYDROTHEBAINE
M-60; M-60A; CL-108,482; a thebaine derivative; Schedule I; No CSA Code assigned; Import/Export permits required.

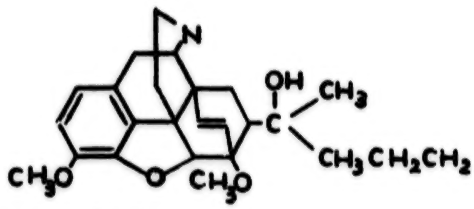
$C_{29}H_{33}NO_4$



Molecular weight - 459.56

23. 6,14-ENDOETHENO-7-(2-HYDROXY-2-PENTYL)TETRAHYDROTHEBAINE
M-53; a thebaine derivative; Schedule I; No CSA Code assigned; Import/Export permits required.

$C_{26}H_{35}NO_4$

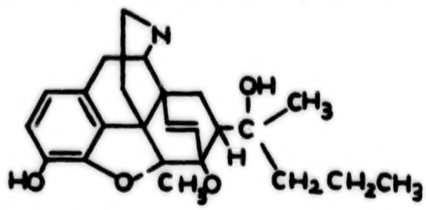


Molecular weight - 425.55

HCL - Percentage of anhydrous base - 92.1

24. 6,14-ENDOETHENO-7-(2-HYDROXY-2-PENTYL)-TETRAHYDRO-ORIPAVINE
M-99; (M-123); N.I.H.-8068; Etorphine a thebaine derivative; Schedule I; CSA Code #-9056; Import/Export permits required.

$C_{25}H_{33}NO_4 \cdot H_2O$

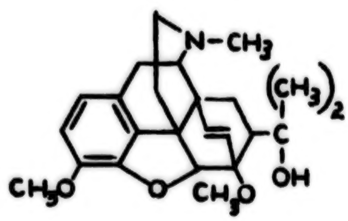


Molecular weight - 429.54

HCL - Percentage of anhydrous base - 92.0

25. 6,14-ENDO ETHENO-7-(2-HYDROXY-2-PROPYL)TETRAHYDRO THEBAINE
M-50; a thebaine derivative; Schedule I; No CSA Code assigned; Import/Export permits required.

$C_{24}H_{31}NO_4$

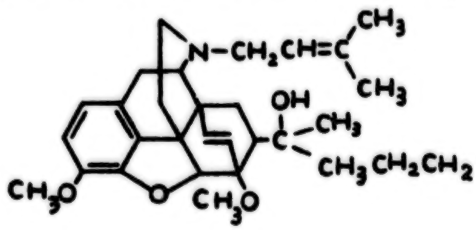


Molecular weight - 397.50

HCL - Percentage of anhydrous base - 91.8

26. 6,14-ENDO-ETHENO-N-DIMETHALLYL-7-(2-HYDROXY-2-PENTYL)TETRAHYDRONORTHEBAINE
M-252; a thebaine derivative; Schedule I; No CSA Code assigned; Import/Export permits required.

$C_{30}H_{41}NO_4$



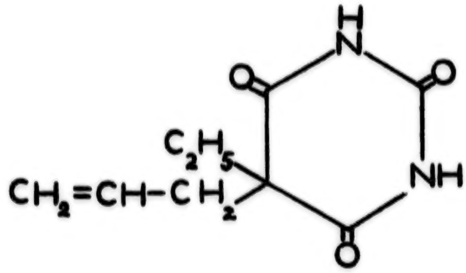
Molecular weight - 479.64

27. ETHALLOBARBITAL

5-allyl-5-ethylbarbituric acid; Aethallymal; Aethylal; Dormin; Dormitiv; Dorval; Ethallymal; GO-1067; Schedule III; CSA Code #-2100; Form 236.

$C_9H_{12}N_2O_3$

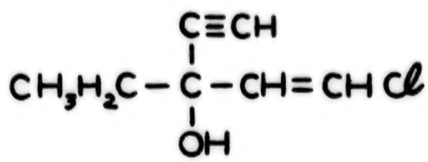
Molecular weight - 196.06



28. ETHCHLORVYNOL

1-chloro-3-ethyl-1-penten-4-yn-3-ol; ethyl Beta chlorovinyl ethynl carbinol; Placidyl Ethchlorvinyl; Schedule IV; oral Rx; CSA Code #-2540 Form 236.

C_7H_9CLO

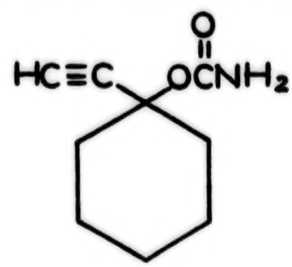


29. ETHINAMATE

Carbamic acid 1-ethynylcyclohexyl; Schedule IV; oral Rx; CSA Code #-2545; Form 236.

$C_9H_{13}NO_2$

Molecular weight - 167.20



30. ETHYL 1-(2-BENZYLOXYETHYL)-4-PHENYL-4-PIPERIDINE CARBOXYLATE

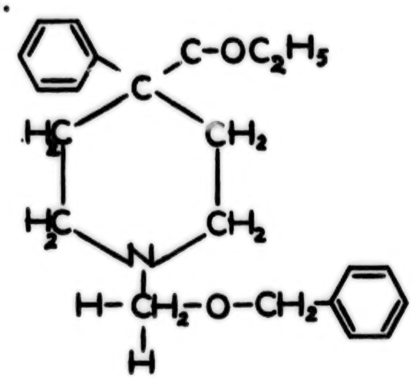
Benzethidine; N.I H.-7574; Schedule I; a pethidine derivative; CSA Code #-9609; Import/Export permits required.

$C_{23}H_{29}NO_2$

Molecular weight - 367.40

HBr - Percentage of anhydrous base - 82.14

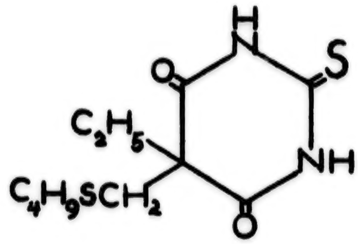
HCL - Percentage of anhydrous base - 90.94



31. 5-ETHYL-5-[(BUTYLMERCAPTO)-METHYL]-2-THIOBARBITURIC ACID
Thionarcon; Schedule III; CSA Code #-2100; Form 236.

$C_{11}H_{18}N_2O_2S_2$

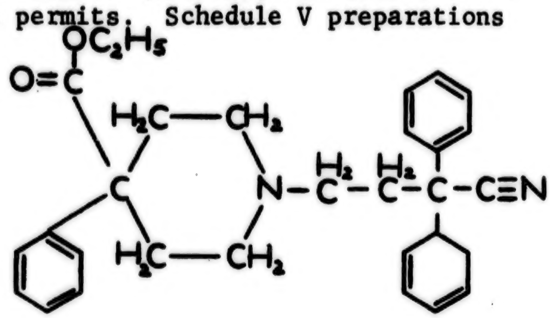
Molecular weight - 274.41



32. ETHYL 1-(3-CYANO-3,3-DIPHENYLPROPYL)-4-PHENYL-4-PIPERIDINE CARBOXYLATE
Diphenoxylate; a pethidine derivative; Schedule II; used in Schedule V preparations only; See Lomotil(searle); CSA Code #-9170. Pure base requires import/Export permits. Schedule V preparations require Form 236.

$C_{30}H_{32}N_2O_2$

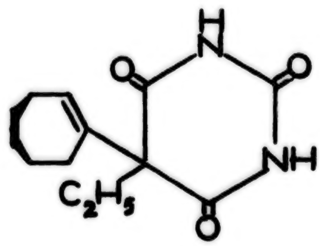
Molecular weight - 452.60



33. 5-ETHYL-5-CYCLOHEPTENYL BARBITURIC ACID
Heptabarbital; Ircodin; Medapan; Medomin; Medomine; Meliobal; Medopan; Schedule III; CSA Code #-2100; Form 236.

$C_{13}H_{18}N_2O_3$

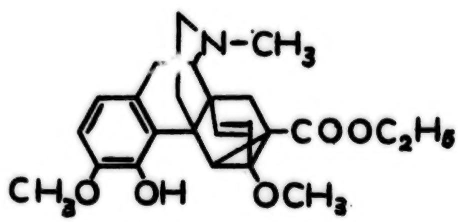
Molecular weight - 250.29



34. ETHYL 5,7-DEHYDRO-6-O-METHYL-6, 14-ENDOETHENO DIHYDROTHEBINOL-7-CARBOXYLATE
A thebaine derivative; Schedule I; No CSA Code assigned; Import/Export permits required.

$C_{24}H_{29}NO_5 \cdot H_2O$

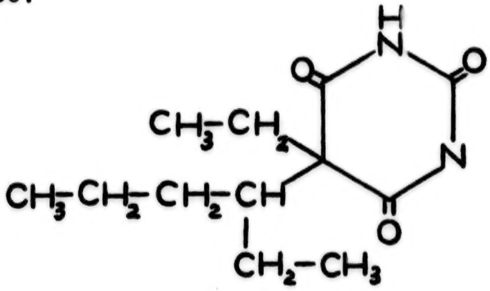
Molecular weight - 429.50



35. 5-ETHYL-5-(1-ETHYLBUTYL)BARBITURIC ACID
Tetrabarbital; Butysal; Butysedal; J.L.991; Tetramal; Schedule III; CSA Code #-2100; Form 236.

$C_{12}H_{20}N_2O_3$

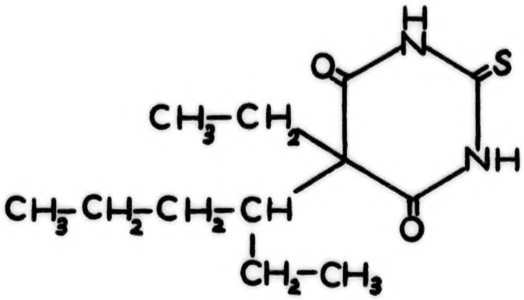
Molecular weight - 240.31



36. 5-ETHYL-5-ETHYL BUTYL-2-THIOBARBITURIC ACID
Thionarcex; thiotetrabarbital; Thiotetramal; Schedule III; CSA Code #-2100; Form 236.

$C_{12}H_{20}N_2O_2S$

Molecular weight - 254.16

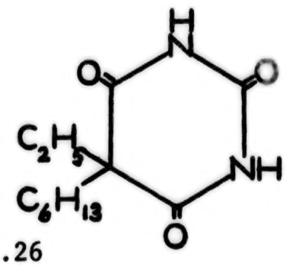


37. 5-ETHYL-5-HEXYLBARBITURIC ACID
Hexethal; Hebaral; Hexathal; Ortal; Schedule III; CSA Code #-2100; Form 236.

$C_{12}H_{20}N_2O_3$

Molecular weight - 240.09

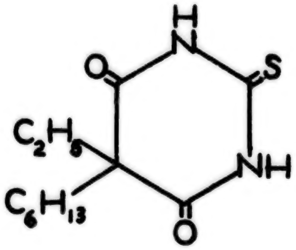
Na Salt - Percentage of anhydrous base - 91.26



38. 5-ETHYL-5-HEXYL-2-THIOBARBITURIC ACID
Thiohexethal; Schedule III; CSA Code #-2100; Form 236.

$C_{12}H_{20}N_2O_2S$

Molecular weight - 256.16

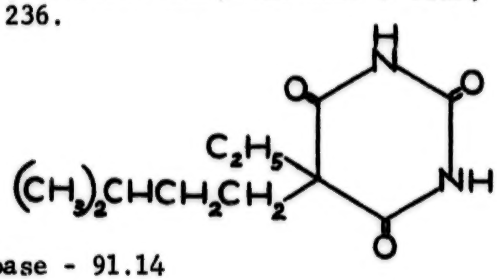


39. 5-ETHYL-5-ISOPENTYLBARBITURIC ACID
Amobarbital; Amobarbitone; Amylobarbitone; Amytal, (Lilly); Co-Elorine, (Lilly); Dexamyl, (S.K.F.); Schedule III; CSA Code #-2125; a barbituric acid derivative; Form 236.

$C_{11}H_{18}N_2O_3$

Molecular weight - 226.27

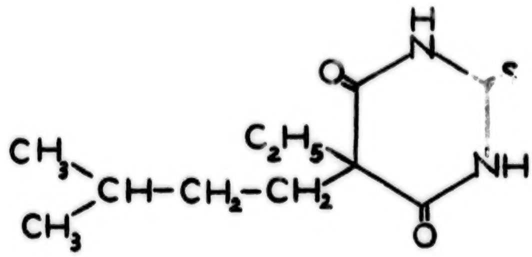
Na Salt - Percentage of anhydrous base - 91.14



40. 5-ETHYL-5-ISOPENTYL-2-THIOBARBITURIC ACID
Thioamobarbital; Thioamylta; Thioethamyl; V-007; Schedule III; CSA Code #-2100; Form 236.

$C_{11}H_{18}N_2O_2S$

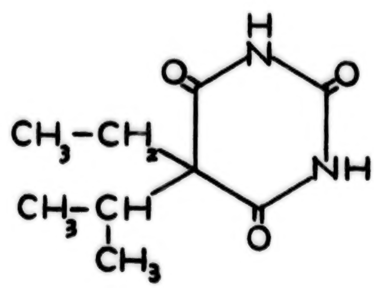
Molecular weight - 258.15



41. 5-ETHYL-5-ISOPROPYLBARBITURIC ACID
Probarbital; Ethylpropymal; Irenal; Ipral; Schedule III; oral Rx; CSA Code #-2100; Form 236.

$C_9H_{14}N_2O_3$

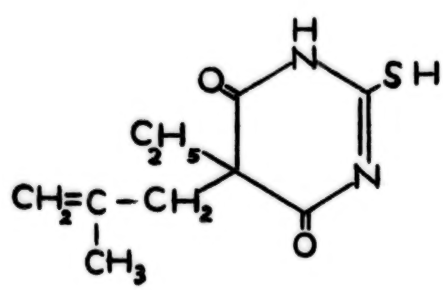
Molecular weight - 198.22



42. 5-ETHYL-5-(2-METHYLALLYL)-2-THIOBARBITURIC ACID
Methallatal; Miosidal; V-12; Schedule III; CSA Code #-2100; Form 236.

$C_{10}H_{14}N_2O_2S$

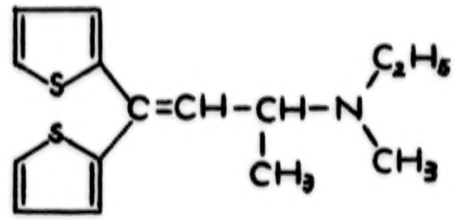
Molecular weight - 226.29



43. 3-ETHYLMETHYLAMINO-1, 1-DI-(2-THIENYL)-1-BUTENE
Ethylmethylthiambutene; Schedule I; CSA Code #-9623; Import/ Export permits required.

$C_{15}H_{19}NS_2$

Molecular weight - 277.23

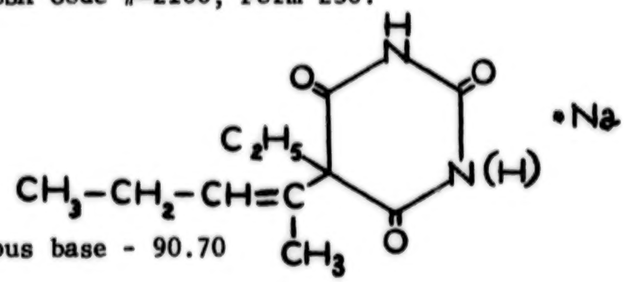


44. 5-ETHYL-5-(1-METHYL-1-BUTENYL)BARBITURIC ACID
Vinbarbital; Schedule III; CSA Code #=2100; Form 236.

$C_{11}H_{16}N_2O_3$

Molecular weight - 224.26

Na Salt - Percentage of anhydrous base - 90.70

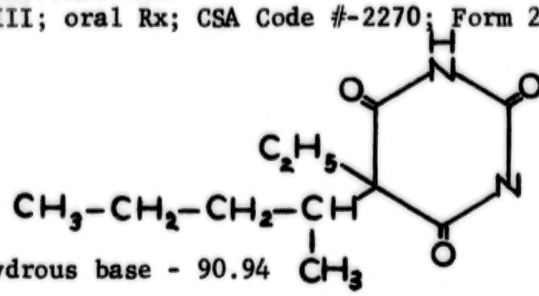


45. 5-ETHYL-5-(1-METHYLBUTYL)BARBITURIC ACID
Pentobarbital; Schedule III; oral Rx; CSA Code #-2270; Form 236.

$C_{11}H_{17}N_2O_3$

Molecular weight - 225.23

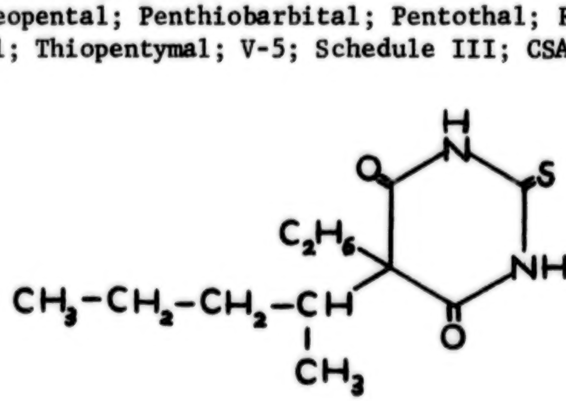
Na Salt - Percentage of anhydrous base - 90.94



46. 5-ETHYL -5-(1-METHYLBUTYL)-2-THIOBARBITURIC ACID
Thiopental; Intraval, Leopental; Penthiobarbital; Pentothal; RP-245; Thio-Barbityral; Thiobarsol; Thiopentymal; V-5; Schedule III; CSA Code #-2100; Form 236.

$C_{11}H_{18}N_2O_2S$

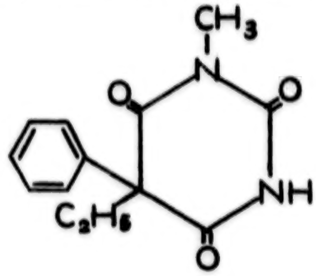
Molecular weight - 242.15



47. 5-ETHYL-N-METHYL-5-PHENYLBARBITURIC ACID
Methylphenobarbital; Barbiphanoal; Isonal; Mebaral; Mephobarbital; Mephytal; Prominal; Promitone; Protheonal; Schedule IV ; CSA Code #-2100; Form 236.

$C_{13}H_{14}N_2O_3$

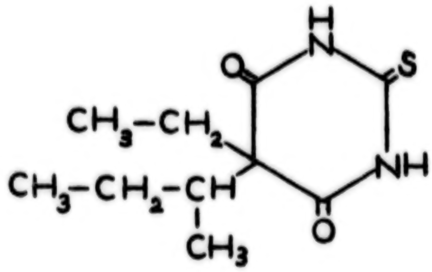
Molecular weight - 246.26



48. 5-ETHYL-5-(1-METHYLPROPYL)-2-THIOBARBITURIC ACID
5-sec-Butyl-5-ethyl-2-thiobarbituric acid; Brevinarcon; Inactin; Inaktin; Narkothion; Schedule III; oral Rx; CSA Code #-2100; Form 236.

$C_{10}H_{16}N_2OS$

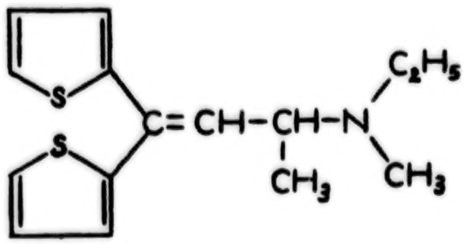
Molecular weight - 228.32



49. ETHYLMETHYLTHIAMBUTENE
Emethibutin; Ethylmethiambutene; 3-ethylmethyl-amino-1,1-di-(2 thienyl)-1-butene; Schedule I; CSA Code #-9623; Import/Export permits required.

$C_{15}H_{19}NS_2$

Molecular weight - 277.23

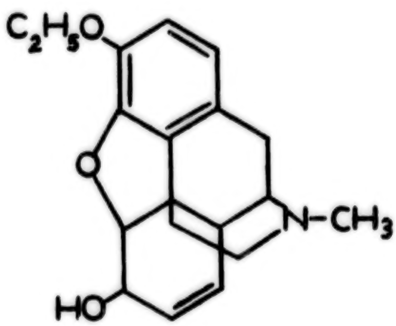


50. ETHYLMORPHINE
Dionin, Schedule II; written Rx; CSA Code #-9190; Import/Export permits required.

$C_{19}H_{23}NO_2$

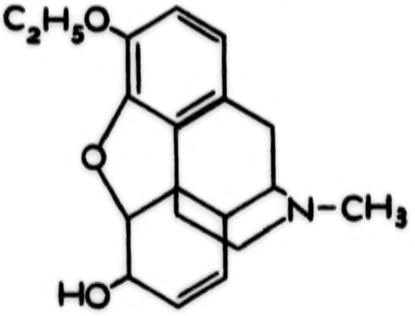
Molecular weight - 313.38

HCL - Percentage of anhydrous base - 81.47



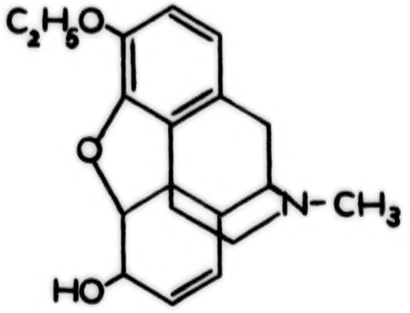
51. ETHYLMORPHINE

Schedule III; oral Rx; CSA Code #-9808; Import/Export permits required. Not more than 300 milligrams of ethylmorphine per 100 milliliters (1.37 grains per 29.573 cc) or not more than 15 milligrams (approximately ¼ grain) per dosage unit, with one or more active, non-narcotic ingredients in recognized amounts.



52. ETHYLMORPHINE

Schedule V; OTC; CSA Code #-9192; Form 236. Not more than 100 milliliters or per 100 grams (.46 grains per 29.573 cc).

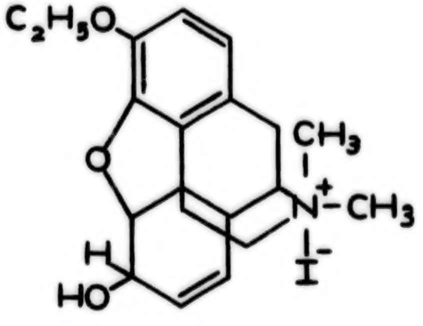


53. ETHYLMORPHINE METHYLIODIDE*

A morphine derivative; Schedule I; CSA Code #-9195; Import/Export permits required.

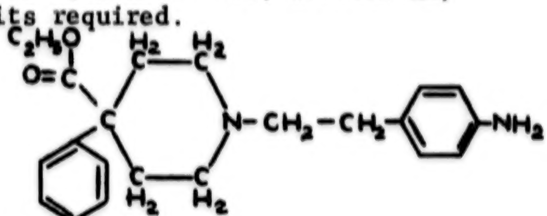
$C_{19}H_{23}NO_3 \cdot CH_3I$

Molecular weight - 455.33



*Corrigendum-Not listed in any schedule of the Law. However, it has no currently accepted medical use in treatment in the United States and is controlled under the Single Convention.

54. ETHYL-1-/(2-PARA-AMINOPHENYL)-ETHYL/-4-PHENYLPIPERIDINE-4-CARBOXYLATE
Anileridine(Merck); Leritine; Lerinol; Schedule II; written Rx; CSA Code #-9020; Import/Export permits required.



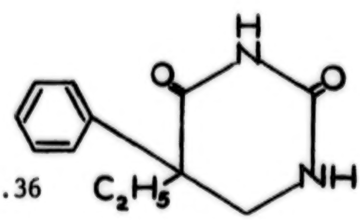
$C_{22}H_{28}N_2O_2$

Molecular weight - 352.38

Percentage of anhydrous base - DiHCL - 82.85

Phosphate - Percentage of anhydrous base - 78.25

55. 5-ETHYL-5-PHENYLBARBITURIC ACID
Phenobarbital; phenylethylmalonylurea; Schedule IV; oral Rx; CSA Code #-2285; Form 236.

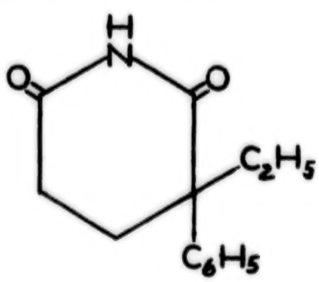


$C_{12}H_{12}N_2O_3$

Molecular weight - 232.23

Na Salt - Percentage of anhydrous base - 91.36

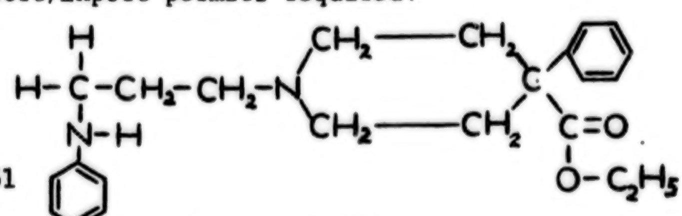
56. 2-ETHYL-2-PHENYL-GLUTARIMIDE
Glutethimide; Doriden(Ciba-Geigy); Schedule III; oral Rx; CSA Code #-2550; Form 236.



$C_{13}H_{15}O_2N$

Molecular weight - 217.26

57. ETHYL-4-PHENYL-1-/3-(PHENYLAMINOL-PROPYL)/-4-PIPERIDINECARBOXYLATE
Alvodine; N.I.H -7590; Piminodine; Win-14098; Schedule II; written Rx; CSA Code #-9730; Import/Export permits required.



$C_{23}H_{30}N_2O_2$

Molecular weight - 366.51

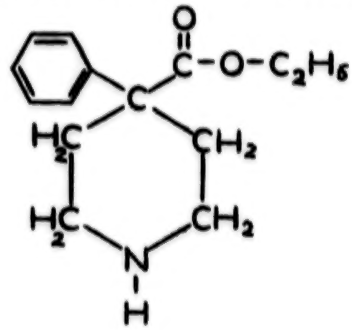
Dichloride - Percentage of anhydrous base - 83.40

Ethanesulfonate - Percentage of anhydrous base - 76.89

58. ETHYL-4-PHENYLPIPERIDINE-4-CARBOXYLATE
Pethidine intermediate-B; normeperidine; norpethidine; a precursor of diphenoxylate and pethidine; Schedule II; without medical utility; CSA Code #-9233.

$C_{14}H_{19}NO_2$

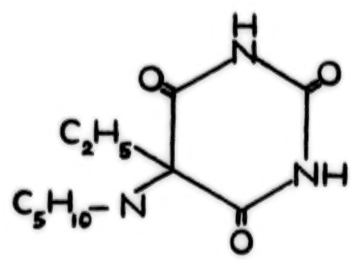
Molecular weight - 233.30



59. 5-ETHYL-5-(1-PIPERIDYL) BARBITURIC ACID
Eldoral; Schedule III; CSA Code #-2100; Form 236.

$C_{11}H_{17}N_3O_3$

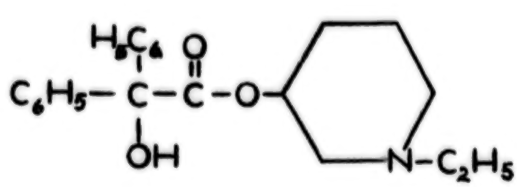
Molecular weight - 239.26



60. N-ETHYL-3-PIPERIDYL BENZILATE
JB-318,(Lakeside); an hallucinogenic substance; Schedule I; CSA Code #-7482; Import/Export permits required.

$C_{21}H_{20}O_3N$

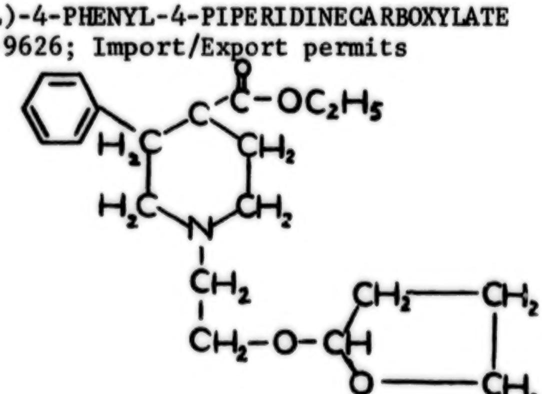
Molecular weight - 334.40



61. ETHYL 1-(2-TETRAHYDRO FURFURYLOXY ETHYL)-4-PHENYL-4-PIPERIDINECARBOXYLATE
Furethidine; Schedule I; CSA Code #-9626; Import/Export permits required.

$C_{20}H_{29}NO$

Molecular weight - 347.46

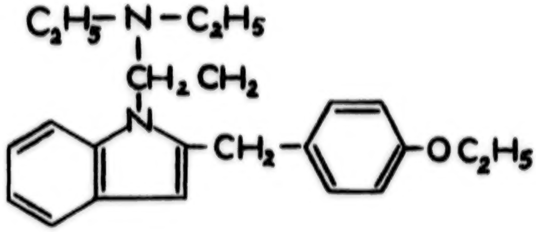


62. ETONITAZENE

(2-)p-ethoxybenzyl)-1-diethylaminoethyl-5-nitrobenzimidazole; Schedule I; CSA Code #-9624; Import/Export permits required.

$C_{22}H_{28}N_4O_3$

Molecular weight - 396.25



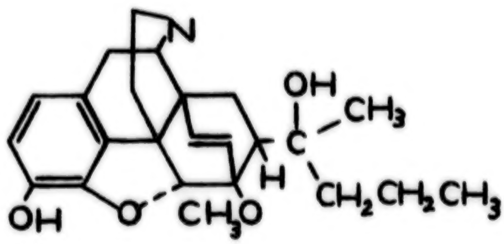
63. ETORPHINE

M-99, (the hydrochloride salt); tetrahydro-7, alpha (1-hydroxy-1-methylbutyl)-6, 14-endo etheno-oripavine; Schedule I; CSA Code #-9056; Import/Export permits required. Currently being evaluated for use in veterinary medicine.

$C_{25}H_{33}NO_4$

Molecular weight - 411.55

HCL - Percentage of anhydrous base - 91.85

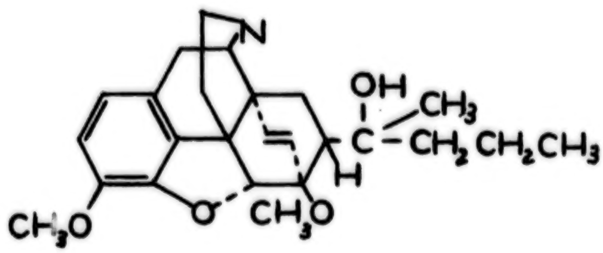


64. ETORPHINE-3-METHYLETHER

M-53; 3-methoxy-6, 14-endo-etheno 5,7,8,8-tetrahydro-7(2-hydroxypent-2-yl) oripavine; Schedule I; CSA Code #-9057; Import/Export permits required.

$C_{26}H_{35}NO_4$

Molecular weight - 425.58

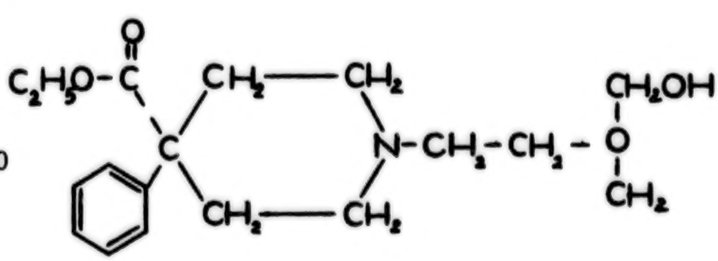


65. ETOXERIDINE

Atenorax; Atenos; Carbetidine; 1-[2-hydroxyethoxy)-ethyl]-4-phenylpiperidine-4-carboxylic acid ethylester; Schedule I; CSA Code #-9625; Import/Export permits required.

$C_{18}H_{27}NO_4$

Molecular weight - 321.40



Corrigendum-Not listed in any schedule of the Law. However, it has no currently accepted medical use in treatment in the United States and is controlled under the Single Convention.

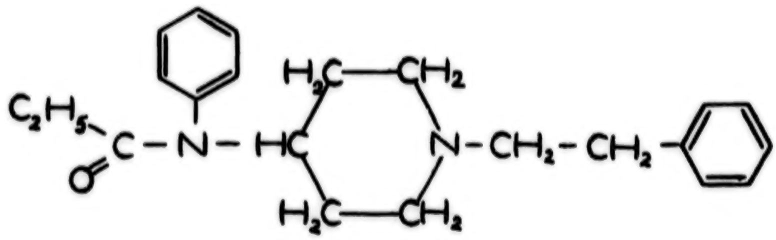
F

1. FENTANYL
McN-JR-4623; Sublimaze; 1-phenethyl-4-N-propionylanilinopiperidine; Schedule II; CSA Code #-9801; Import/Export permits required.

$C_{22}H_{28}N_2O$

Molecular weight - 336.48

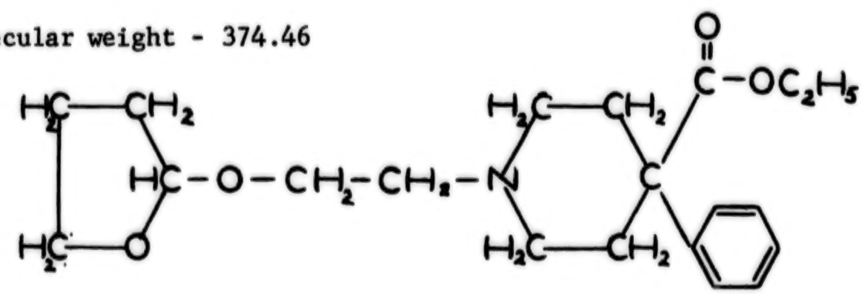
Citrate Salt - % of anhydrous base - 64.00



2. FURETHIDINE
Ethyl 1-(2-tetrahydro furfuryloxy ethyl)-4-phenyl-4-piperidine-carboxylate; Schedule I; CSA Code #-9626; Import/Export permits required.

$C_{20}H_{29}NO$

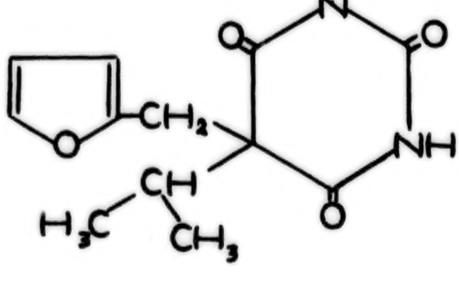
Molecular weight - 374.46



3. 5-FURFURYL-5-ISOPROPYL BARBITURIC ACID
Dormovit; Schedule III; CSA Code #-2100; Form 236.

$C_{12}H_{17}N_2O_4$

Molecular weight - 236.96



1. GENOCODEINE
Codeine-N-oxide; N-oxycodeine; Schedule I; CSA Code #-9053; Import/Export permits required.

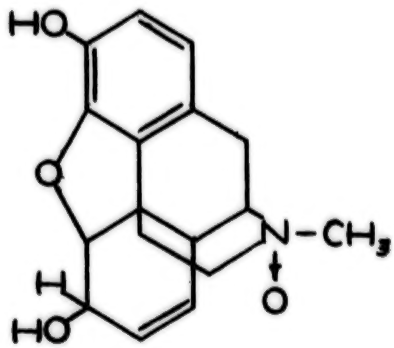
$C_{18}H_{21}NO_4$

Molecular weight - 315.37

2. GENOMORPHINE
Morphine-N-oxide; N-oxymorphine; Schedule I; CSA Code #-9307; Import/Export permits required.

$C_{17}H_{19}NO_4$

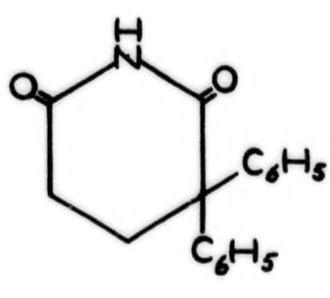
Molecular weight - 301.33



3. GLUTETHIMIDE
2-ethyl, 2-phenyl-glutarimide; Doriden (USV); Schedule III; oral Rx; CSA Code #-2550; Form 236.

$C_{13}H_{15}O_2N$

Molecular weight - 217.26



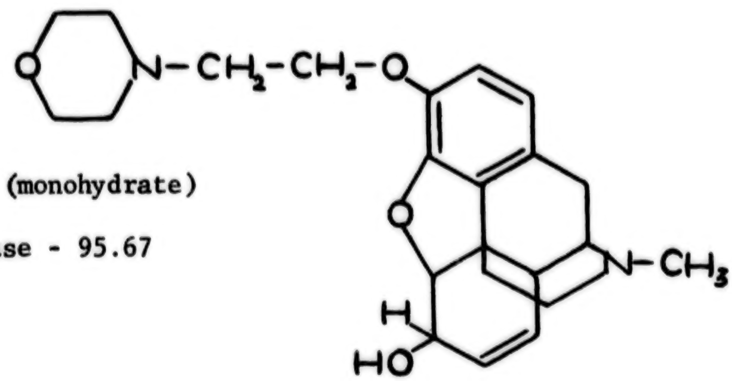
1. HASHISH

An alcohol extract of Cannabis sativa; See Cannabis and marihuana; Schedule I; No CSA Code assigned; Research only; Import/Export permits required. Also referred to as Bhang, Cannabis, Charas, Ganja and Marihuana. See resume on "Cannabis sativa", page 37.

2. HEMOCODEINE

Pholcodine; 3-/2-(4-morpholinyl)ethyl/morphine; tetrahydrol-1,4-oxazinylmethyl-codeine; Schedule I; CSA Code 9314; Import/Export permits required. Pholcodine is being evaluated for its antitussive properties.

$C_{23}H_{30}N_2O_4 \cdot HOH$



Molecular weight - 416.50 (monohydrate)

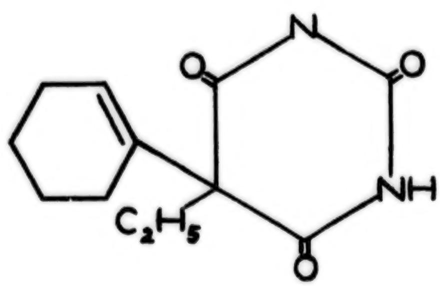
Percentage of anhydrous base - 95.67

3. HEPTABARBITAL

5-ethyl-5-cycloheptenyl barbituric acid; Ircodin; Medapan; Medomin; Medomine; Meliobal; Medopan; Schedule III; CSA Code #-2100; Form 236.

$C_{13}H_{18}N_2O_3$

Molecular weight - 250.29

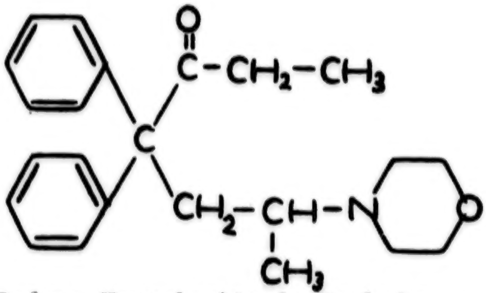


4. HEPTALGIN

Phenadoxone; Heptalin; Hepagin; Heptan; Heptazone; Heptzone; 4, 4-diphenyl-6-morpholino-heptanone-3; 6-morpholino-4, 4-diphenyl-3-heptanone; Schedule I; CSA Code #-9637; Import/Export permits required.

$C_{23}H_{29}NO_2$

Molecular weight - 351.47



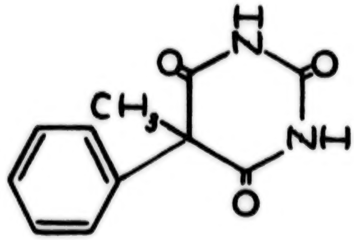
5. HEPTOBARBITAL

5-methyl-5-phenylbarbituric acid; Eudan; Heptobarbital; Mephebarbital; Methophenobarbitone; Rutonal; Schedule III; CSA Code #-2100; Form 236.

$C_{11}H_{10}N_2O_3$

Molecular weight - 218.31

Na Salt - Percentage of anhydrous base - 90.85



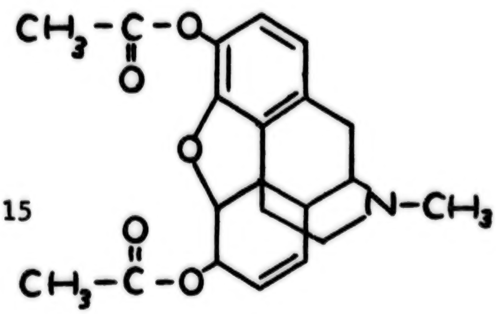
6. HEROIN

A trade name for diacetylated morphine; diamorphine. See Diacetylmorphine; Schedule I; CSA Code #-9200; Import/Export permits required.

$C_{21}H_{23}NO_5$

Molecular weight - 369.40

HCl - Percentage of anhydrous base - 87.15

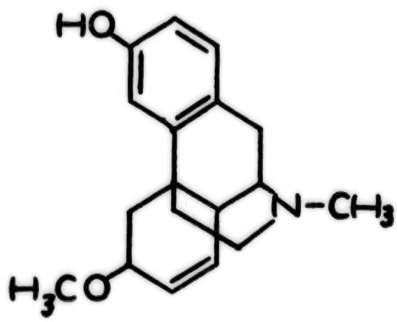


7. HETEROCODEINE

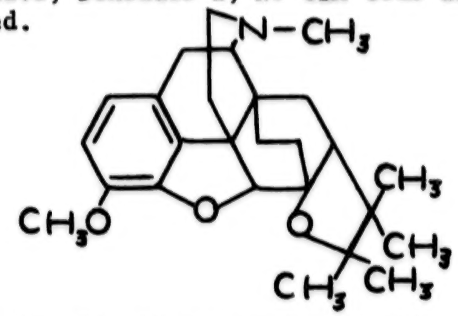
6-Morphine methyl ether; Schedule I; No CSA Code assigned; Import/Export permits required.

$C_{18}H_{21}O_3N$

Molecular weight - 371.64



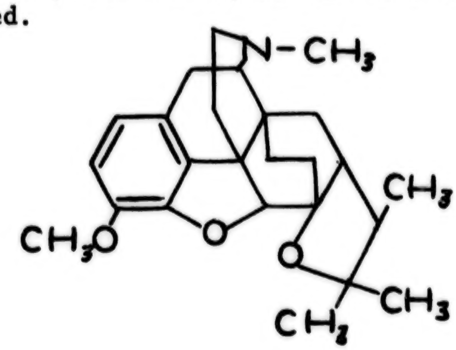
8. 2', 3', 4', 5', 7,8-HEXAHYDRO-4',4',5',5'-TETRAMETHYL-6, 14-ENDO-ETHANOFURANO-(2', 3',:6,7)CODIDE
M-6624; a thebaine derivative; Schedule I; No CSA Code assigned; Import/Export permits required.



$C_{26}H_{25}NO_3$

Molecular weight - 409.35

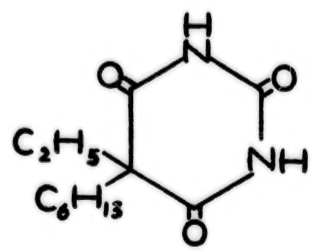
9. 2', 3', 4', 5', 7,8-HEXAHYDRO-4', 5', 5'-TRI-METHYL-6, 14 ENDO-ETHANOFURANO (2', 3',:6,7)-CODIDE
M-6622; a thebaine derivative; Schedule I; No CSA Code assigned; Import/Export permits required.



$C_{25}H_{33}NO_3$

Molecular weight - 395.53

10. HEXETHAL
5-ethyl-5-hexylbarbituric acid; Hebaral; Hexathal; Ortal; Schedule III; CSA Code #-2100; Form 236.

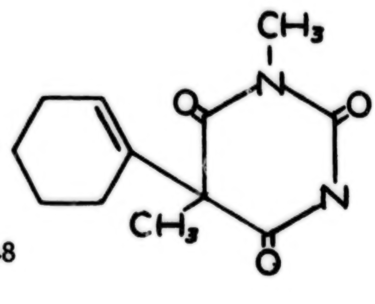


$C_{12}H_{20}N_2O_3$

Molecular weight - 240.09

Na Salt - Percentage of anhydrous base - 91.26

11. HEXOBARBITAL
5-(1-cyclohexen-1-yl)-1,5-dimethylbarbituric acid; Schedule III; oral Rx; CSA Code #-2100; Form 236.



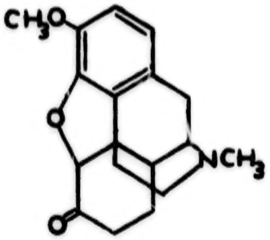
$C_{12}H_{16}N_2O_3$

Molecular weight - 236.26

Na Salt - Percentage of anhydrous base - 91.48

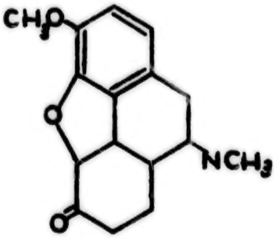
12. HYDROCODONE

Schedule III; oral Rx; CSA Code #-9805; Not more than 300 milligrams of hydrocodone per 100 milliliters (1.37 grains per 29.573 cc) or not more than 15 milligrams (approximately ¼ grain) per dosage unit, with a four-fold or greater quantity of an isoquinoline alkaloid of opium.



13. HYDROCODONE

Dihydrocodeinone; Schedule III; CSA Code #-9806; Not more than 300 milligrams of hydrocodone per 100 milliliters (1.37 grains per 29.573 cc) or not more than 15 milligrams (approximately ¼ grain) per dosage unit; with one or more active; non-narcotic ingredients in recognized therapeutic amounts. See Tussionex, Ambenyl Exp.) Bredative-DHC; etc.



14. HYDROCODONE

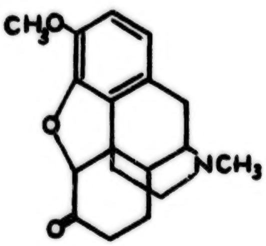
Dihydrocodeinone; Schedule II; CSA Code #-9193; Import/Export permits required.

$C_{18}H_{21}NO_3$

Molecular weight - 299.36

Bitartrate Salt - Percentage of anhydrous base - 61.00

HCL Salt - Percentage of anhydrous base - 81.00



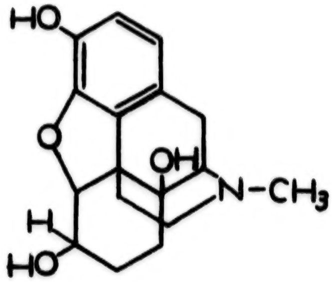
*The synthetic benzylisoquinoline alkaloids of opium are excepted from controls. See Schedule II(a)(2).

15. HYDROMORPHINOL

14-hydroxydihydromorphine; Schedule I; CSA Code #-9301; Import/Export permits required.

$C_{17}H_{21}NO_4$

Molecular weight - 303.36



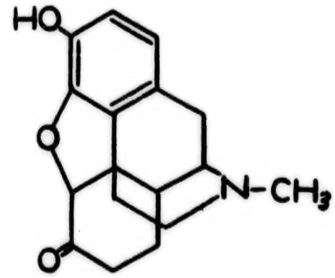
16. HYDROMORPHONE

Dilaudid(Knoll); dihydromorphinone; Schedule II; CSA Code #-9194; Import/Export permits required.

$C_{17}H_{19}NO_3$

Molecular weight - 285.33

HCL Salt - Percentage of anhydrous base - 88.66

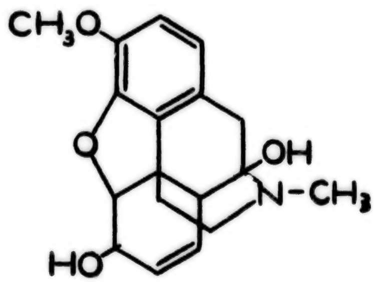


17. 9-HYDROXYCODEINE

Schedule I; No CSA Code assigned; Import/Export permits required.

$C_{18}H_{21}NO_4$

Molecular weight - 315.36

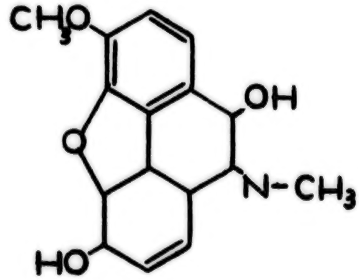


18. 10-HYDROXYCODEINE

Schedule I; No CSA Code assigned; Import/Export permits required.

$C_{18}H_{21}NO_4$

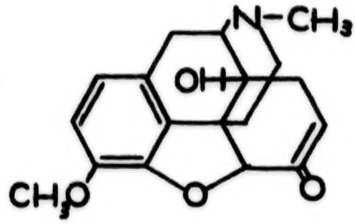
Molecular weight - 315.36



19. HYDROXYCODEINONE
Schedule I; No CSA Code assigned; Import/Export permits required.

$C_{18}H_{19}NO_4$

Molecular weight - 313.34



20. 10-HYDROXYDIHYDROCODEINE
Schedule I; No CSA Code assigned; Import/Export permits required.

$C_{18}H_{23}NO_4$

Molecular weight - 317.38

21. 14-HYDROXYDIHYDROCODEINONE
Oxycodone; dihydrohydroxycodeinone; Schedule II; CSA Code #-9143; Import/Export permits required. See Percodan(Endo).

$C_{18}H_{21}NO_4$

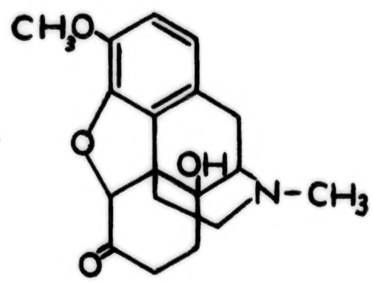
Molecular weight - 315.36

HCL Salt - (without water) Percentage - 89.64

HCL/Terephthalate - 88.93

Terephthalate - 79.00

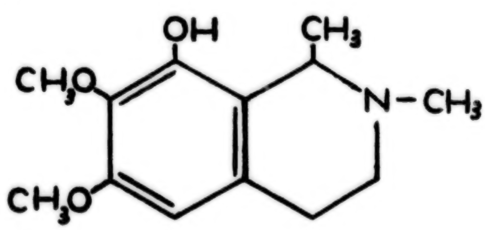
Pectinate - 41.00



22. 8-HYDROXY-6,7-DIMETHOXY-1,2-DIMETHYL-1,2,3,4-TETRAHYDROISOQUINOLINE
Pellotine; a Peyote derivative; Schedule I; CSA Code #-7418; Import/Export permits required.

$C_{13}H_{19}NO_3$

Molecular weight - 237.29



23. 2'-HYDROXY-5, 9-DIMETHYL-2-(2-PHENETHYL)-6, 7-BENZOMORPHAN
Phenazocine; Prinadol(S.K.F.); SKF-6574; N.I.H. 7519; Import/Export permits required.

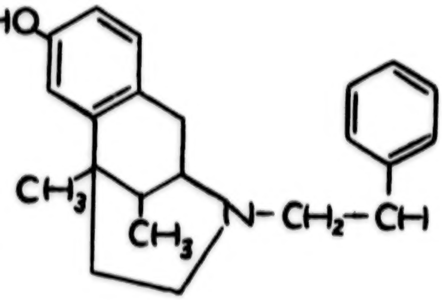
$C_{22}H_{27}NO$

Molecular weight - 321.46

HBr - Percentage of anhydrous base - 79.89

HCl - Percentage of anhydrous base - 88.66

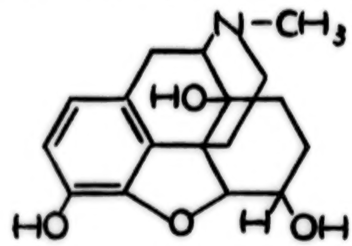
PO_4 - Percentage of anhydrous base-69.51



24. 14-HYDROXYHYDROMORPHINE
Hydromorphinol; Schedule I; CSA Code #-9301; Import/Export permits required.

$C_{17}H_{21}NO_4$

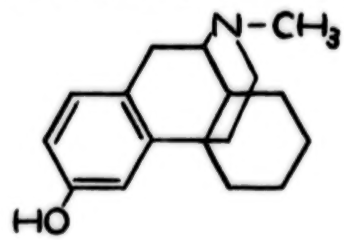
Molecular weight - 339.82



25. 3-HYDROXY-N-METHYL-METAMORPHINAN
Schedule I; No CSA Code assigned; Import/Export permits required.

$C_{17}H_{17}NO$

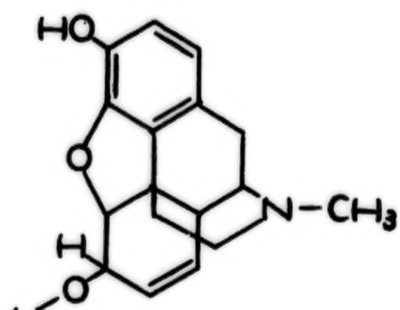
Molecular weight - 287.62



26. 14-HYDROXYMORPHINE
Hydroxymorphine,(M.J.Lewenstein); Schedule I; No CSA Code assigned; Import/Export permits required.

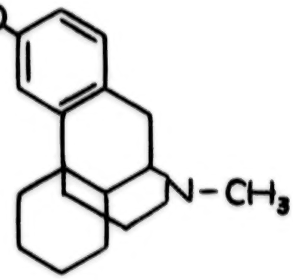
$C_{17}H_{18}NO_4$

Molecular weight - 300.33



27. (-)-3-HYDROXY-N-METHYLMORPHINAN
Levorphanol; Levo-Dromoran(Roche); the levo isomer of morphinan; (-1)-3-hydroxy-N-methylmorphinal; Schedule II; CSA Code #-9220; written Rx; Import/Export permits required.

$C_{17}H_{23}NO$



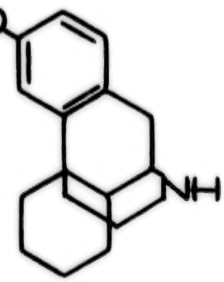
Molecular weight - 257.36

HBr - Percentage of anhydrous base - 76.08

Tartrate - Percentage of anhydrous base - 58.00

28. 1-3-HYDROXYNORMORPHINAN
Norlevorphanol; N.I.H.-7539; RO-1-7686; Schedule I; CSA Code #-9634; Import/Export permits.

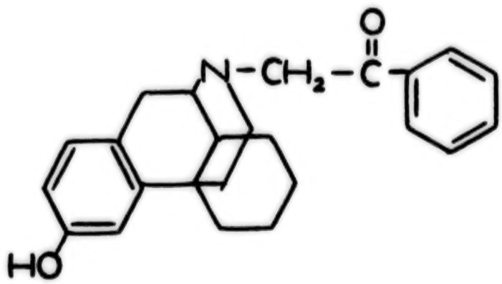
$C_{16}H_{21}NO$



Molecular weight - 243.35

29. 1-3-HYDROXY-N-PHENACYLMORPHINAN
Levophenacylmorphan; N.I.H.-7525; RO-0288; Schedule I; CSA Code #-9631; Import/Export permits required.

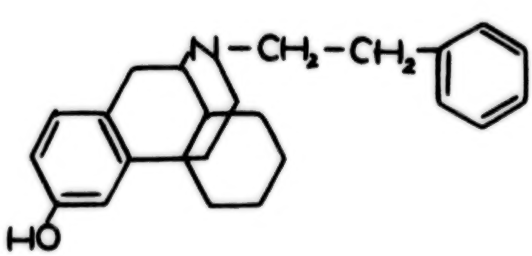
$C_{24}H_{27}NO_2$



Molecular weight -361.49

30. 3-HYDROXY-N-PHENETHYL-MORPHINAN
Phenomorphan; N.I.H.-7274; its racemic and levorotatory forms but excepting its dextrorotatory forms; Schedule I; CSA Code #-9647; Import/Export permits required.

$C_{24}H_{29}NO$

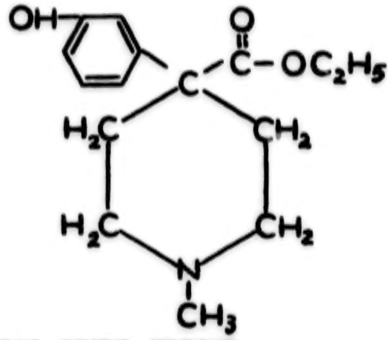


Molecular weight - 347.41

31. HYDROXYPETHIDINE
Bemidone; Oxypetidin; 1-methyl-4-(3-hydroxyphenyl)-piperidine-4-carboxylic acid ethyl ester; Schedule I; CSA Code #-9627; Import/Export permits required.

$C_{15}H_{21}NO_3$

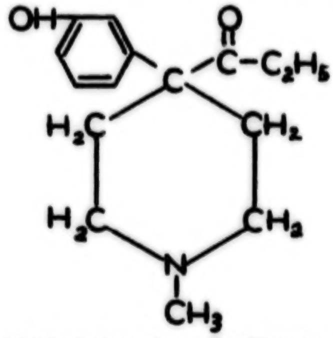
Molecular weight - 263.33



32. 4-(3-HYDROXYPHENYL)-1-METHYL-4-PIPERIDYL ETHYL KETONE
Cliradon; Ketobemidone; Detogan; 1-methyl-4-metahydroxyphenyl-4-propionylpiperidine; Schedule I; CSA Code #-9628; Import/Export permits required.

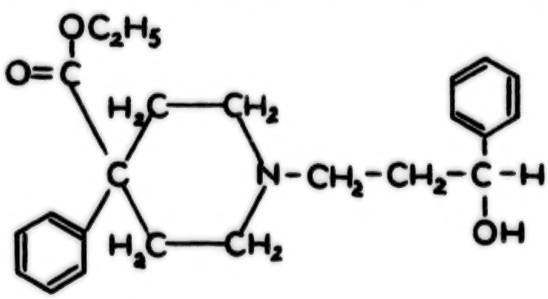
$C_{15}H_{21}NO_2$

Molecular weight - 247.33



33. 1-(3-HYDROXY-3-PHENYLPROPYL)-4-PHENYLPIPERIDINE-4-CARBOXYLIC ACID ETHYL ESTER
Phenoperidine; a pethidine derivative; Schedule I; CSA Code #-9641.

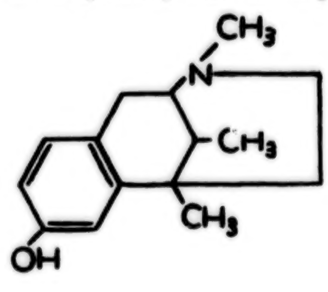
Molecular weight - 367.49



34. *2'-HYDROXY-2,5,0-TRIMETHYL-6,7-BENZOMORPHAN
Metazocine; methobenzorphan; N.I.H.-7539; a morphinan derivative; Schedule I; CSA Code 9240; Import/Export permits required.

$C_{15}H_{21}NO$

Molecular weight - 231.34



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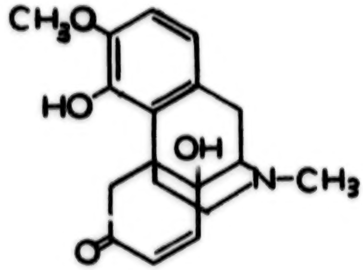
*Corrigendum-Included in Schedule II(b) of the Law. However, it has no currently accepted medical use in treatment in the United States.

35. HYDROXYTHEBAINONE

Schedule I; No CSA Code assigned; Import/Export permits required.

$C_{18}H_{23}NO_3$

Molecular weight - 285.16

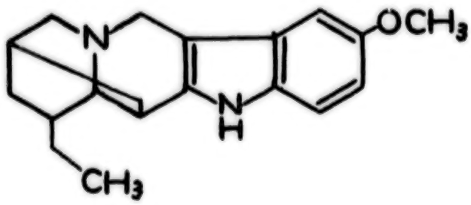


1. IBOGAINE

Ibogine; from the roots of Tabernanthe iboga; Bogadin-TM; Schedule I; CSA Code #-7260; Import/Export permits required.

$C_{20}H_{26}N_2O$

Molecular weight - 310.42

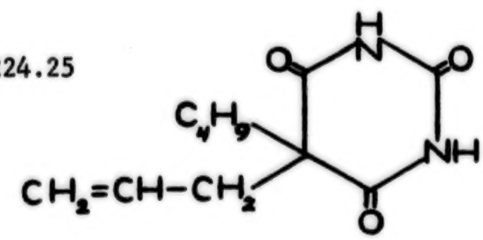


2. IDOBUTAL

N-butylbarbituric acid; 5-allyl-5-n-butylbarbituric acid; Dormupax; Schedule III; CSA Code #-2100; Form 236.

$C_{11}H_{16}N_2O_3$

Molecular weight - 224.25

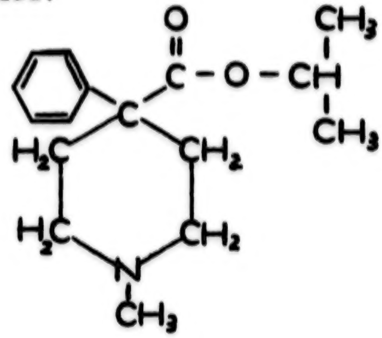


3. IPROPETHIDINE

Properidine; Isopedine; Gevelina; Spasmodolosina; Isopropyl; 1-methyl-4-phenylpiperidine-4-carboxylate; Schedule I; CSA Code #-9644; Import/Export permits required.

$C_{16}H_{23}NO_2$

Molecular weight - 261.34

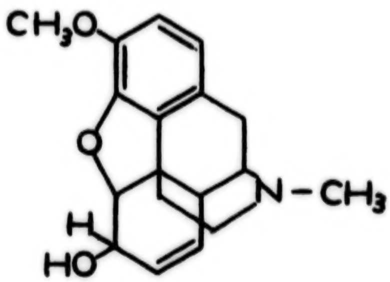


4. ISOCODEINE

Schedule I; No CSA Code assigned; Import/Export permits required.

$C_{18}H_{21}NO_3$

Molecular weight - 298.97

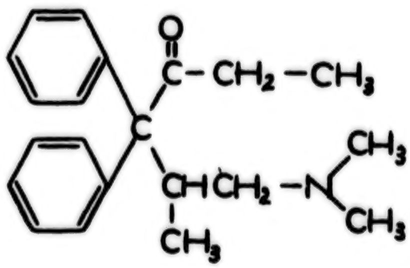


5. ISOMETHADONE *

Isoadanon; Isoamidone; 4,4-diphenyl-5-methyl-6-dimethyl-amino-hexanone; Schedule I; CSA Code #-9226; Import/Export permits required.

$C_{21}H_{27}NO$

Molecular weight - $C_{21}H_{27}NO$



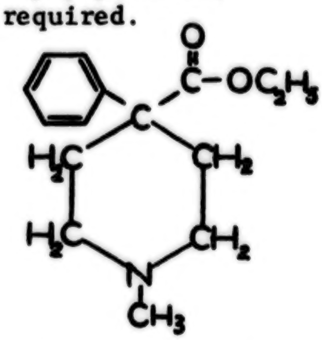
6. ISONIPECAINE

Pethidine; meperidine; the isonipecotic acid isomer of nipecotic acid; Demerol(Winthrop); n-methyl-4-phenyl-4-carbethoxy-piperidine; Schedule II; CSA Code #-9230; Import/Export permits required.

$C_{15}H_{21}NO_2$

Molecular weight - 247.32

HCL Salt - Percentage of anhydrous base - 87.00



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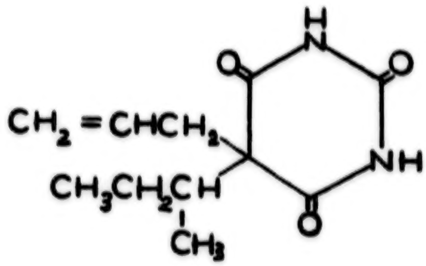
* Corrigendum-Included in Schedule II(b) of the Law. However, it has no currently accepted medical use in treatment in the United States.

7. ITOBARBITAL (Barbituric acid Derivative)
5-allyl-5-isobutylbarbituric acid; alisobumal; butalbital; Schedule III; CSA Code #-2100; oral Rx; Form 236. See Fiorinal; Paradol; Sandoptal; and Tenstan.

$C_{11}H_{16}N_2O_3$

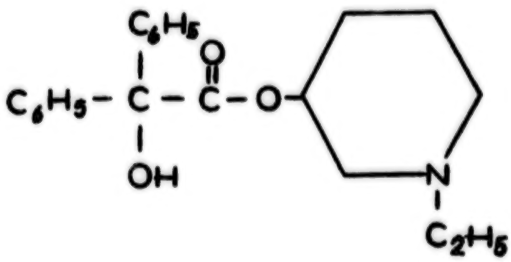
Molecular weight - 224.25



1. JB-318
Lakeside Laboratories; an hallucinogenic substance; N-ethyl-3-piperidyl benzilate; Schedule I; CSA Code #-7482; Import/Export permits required.

$C_{21}H_{20}O_3N$

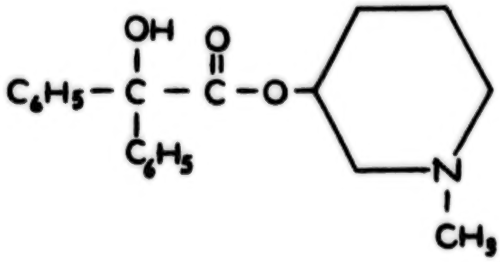
Molecular weight - 334.40



2. JB-336
Lakeside Laboratories; a hallucinogenic substance; Schedule I; CSA Code #-7484; Import/Export permits required.

$C_{20}H_{18}O_3N$

Molecular weight - 320.71



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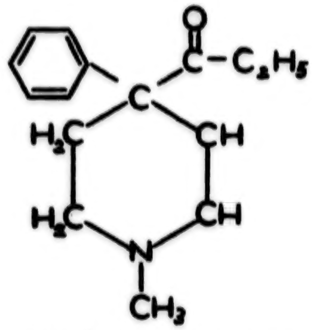
1. **KETOBEMIDONE**

Cliradon; Ketogan; 4-(3-hydroxyphenyl)-1-methyl-4-piperidyl ethyl Ketone; 1-methyl-4-metahydroxyphenyl-4-propionoxypiperidine; Schedule I; CSA Code #-9628; Import/Export permits required.

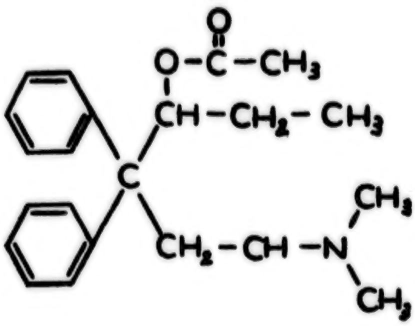
$C_{15}H_{21}NO_2$

Molecular weight - 247.33



1. **LAM**

(-)Alphacetylmethadol; Acemethadone; Acemethadol; (-)Alpha-4, 4-diphenyl-6-dimethylamino-4, 4-diphenyl-3-acetoxyheptane; Schedule I; CSA Code #-9603; Currently being evaluated as a possible replacement for methadone in "maintenance" therapy.



K L

2. **LERITINE**

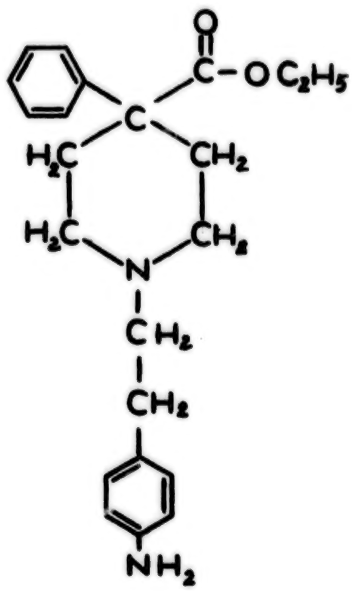
Anileridine(Merck); Lerinol; ethyl-1-/(2-p-aminophenyl)-ethyl/-4-phenylpiperidine-4 carboxylate; Schedule II; written Rx; CSA Code #-9020 Import/Export permits required.

$C_{22}H_{28}N_2O_2$

Molecular weight - 352.28

DiHCL - Percentage of anhydrous base - 82.85

Phosphate - 78.25



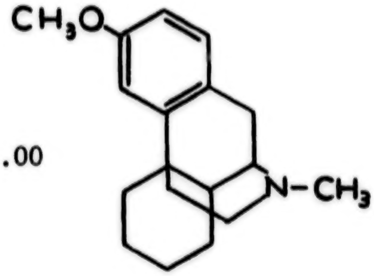
3. *LEVOMETHORPHAN

1-3-methoxy-N-methylmorphin; (2)-3-methoxy-N-methylmorphinan; Schedule I; CSA Code #-9210; Import/Export permits required. The morphinans occur in the usual three optical isomers; i.e., the dextro, levo and racemic. The levo and racemic forms are highly addictive drugs, without medical utility and are controlled both nationally and internationally. The dextro form has failed to exhibit any addictive liabilities and accordingly is not controlled.

$C_{18}H_{25}NO$

Molecular weight - 271.38

Tartrate - Percentage of anhydrous base - 64.00

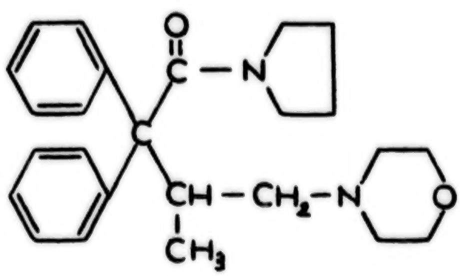


4. LEVOMORIDE

1-3-methyl-2, 2-diphenyl-4-morphinolino-butyryl-pyrrolidine; Schedule I; CSA Code #-9629; Import/Export permits required.

$C_{25}H_{23}N_2O_2$

Molecular weight - 392.55



5. LEVORPHANOL

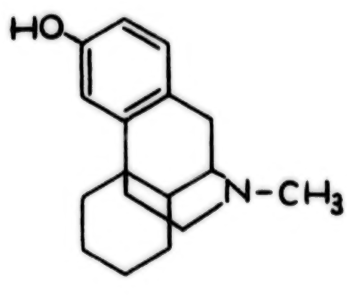
Levo-Dromoran(Roche); the levo isomer of morphinan; (-)1-3-hydroxy-n-methylmorphinan; Schedule II; CSA Code #-9220; Import/Export permits required.

$C_{17}H_{23}NO$

Molecular weight - 257.36

HBr - Percentage of anhydrous base - 76.08

Tartrate - Percentage of anhydrous base - 58.00



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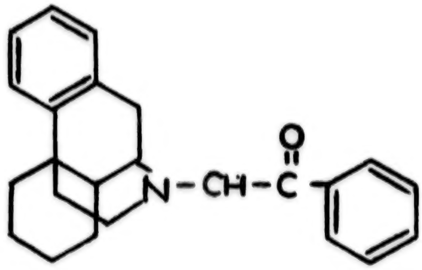
* Corrigendum-Included in Schedule II(b) of the Law. However, it has no currently accepted medical use in treatment in the United States.

6. LEVOPHENACYLMORPHAN
N.I.H.-7525; RO-0288; 1-3-hydroxy-n-phenacylmorphinan; Schedule I; CSA Code #-9631; Import/Export permits required.

$C_{24}H_{27}NO_2$

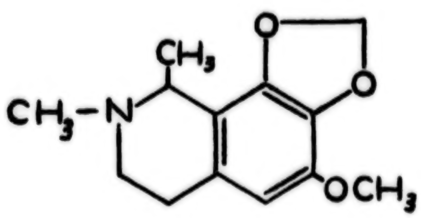
Molecular weight - 361.49



7. LOPHOPHORINE
N-Methylanhalonine; a derivative of the Peyote plant; Schedule I; CSA Code #-7420; Import/Export permits required.

$C_{13}H_{17}NO_3$

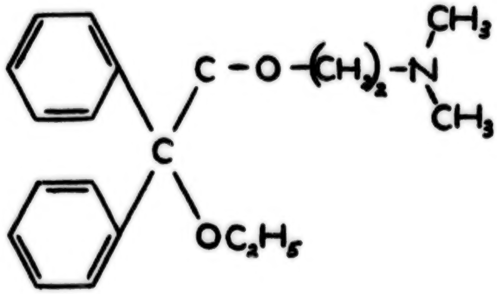
Molecular weight - 235.29



8. LORAKIN
Dimenoxadol; N.I.H.-7577; Dimethylamino-ethyl-1-ethoxy-1, diphenyl-acetate; dimethylaminoethyl diphenyl-a-ethoxyacetate; Schedule I; CSA Code #-9617; Import/Export permits required.

$C_{20}H_{25}NO_3$

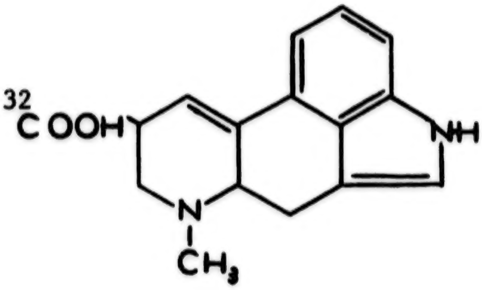
Molecular weight - 327.43



9. LYSERGIC ACID
An ergot derivative; Schedule III; CSA Code #-7300; Form 236.

$C_{16}H_{16}N_2O_2$

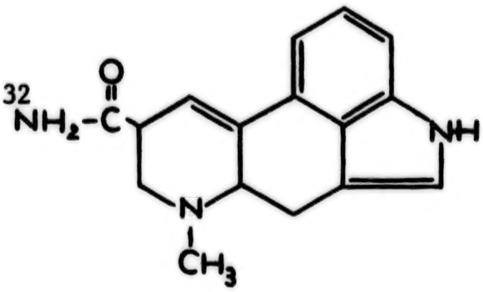
Molecular weight - 268.32



10. LYSERGIC ACID AMIDE
Schedule III; CSA Code #-7310; Form 236.

$C_{16}H_{18}N_3O$

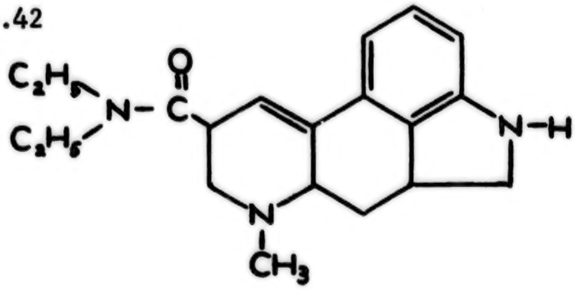
Molecular weight - 267.32



11. LYSERGIC ACID DIETHYLAMIDE
LSD; N, N-diethylsergamide; N, N-diethyl-d-lysergamide; Ald-52; Lysergide; Delysid; D-Lysergic acid diethylamid; Schedule I; CSA Code #-7315; Import/Export permits required.

$C_{20}H_{25}N_3O$

Molecular weight - 323.42

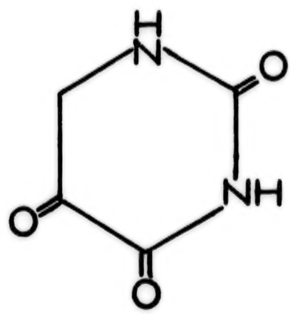


1. MALONYLUREA*

Barbituric acid derivative; 2,4,6-trioxohexahydro pyrimidine or its enol forms. Also includes the seco, buta, penta, cyclo, hexa, etc. derivatives; Schedule III; oral Rx; Form 236; CSA Code #-2100.

$C_4H_4N_2O_3$

Molecular weight - 128.09



2. MARIHUANA

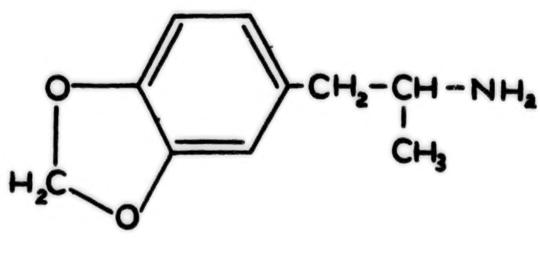
See Cannabis Sativa and Plate No. 1.
Schedule I, Research only; CSA Code #-7360; Also see Section 102 (15) Public Law 91-513.

3. MDA

3,4-methlenedioxy amphetamine; Schedule I; CSA Code #-7400; Import/Export permits required.

$C_{10}H_{13}O_2N$

Molecular weight - 179.22

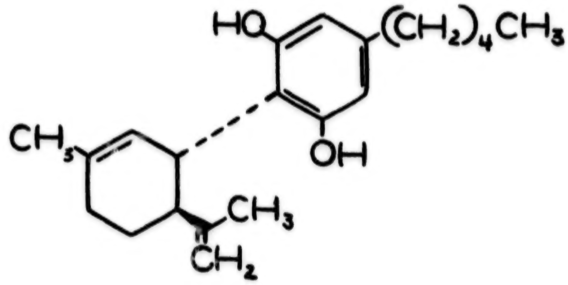


*The Law covers any derivative or salt of a derivative. While numerous theoretical derivatives are possible, only those compounds that are doubly substituted at the No. 5 position are considered active. See Schedule IV for bartital and phenobarbital.

4. 2-P-MENTHA-5,8-DIEN-3-YL-5-PENTYL RESORCINOL
Cannabidol; a cannabis derivative; Schedule I; CSA Code #-7372; Import/Export permits required.

$C_{21}H_{30}O_2$

Molecular weight - 314.45

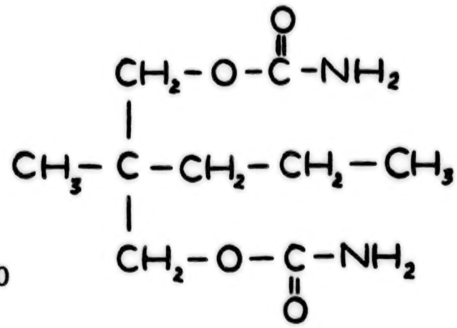


5. MEPROBAMATE
Carbamic acid 2-methyl-2-propyltrimethylene ester; 2 methyl-2-n-propyl-1,3-propanediol dicarbamate; Schedule IV; Code #2820; Form 236; manufactured and/or distributed under generic and several trade named.

$C_9H_{18}N_2O_4$

Molecular weight - 218.25

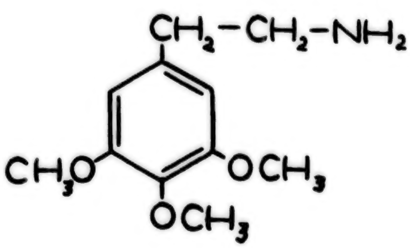
Percentage of anhydrous base - 100



6. MESCALINE
Peyote derivative; 3,4,5-trimethoxyphenethylamine; Mezcaline; Schedule I; CSA Code #-7381; Import/Export permits required.

$C_{11}H_{17}NO_3$

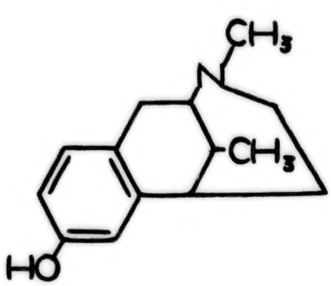
Molecular weight - 211.25



7. *METAZOCINE
Methobenzorphan; N.I.H.-7539; 2'-hydroxy-2,5,9-trimethyl/-6;7-benzomorphinan/; Schedule I; CSA Code #-9240; Import/Export permits required.

$C_{15}H_{21}NO$

Molecular weight - 231.34



*Corrigendum-Included in Schedule II(b) of the Law. However, it has no currently accepted medical use in treatment in the United States.

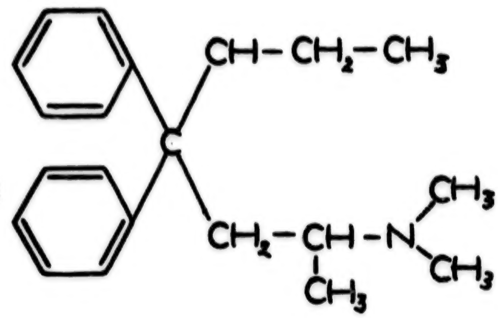
8. METHADOL

Amidol; Dimepheptanol; N.I.H.-2933; 4,4-diphenyl-6-dimethylamino heptanol-3; 6-dimethylamino-4, 4-diphenyl-3-heptanol; a methadone derivative; Schedule I; CSA Code #-9618; Import/Export permits required.

$C_{21}H_{29}NO$

Molecular weight - 311.45

HCL - Percentage of anhydrous base - 89.52



9. METHADONE

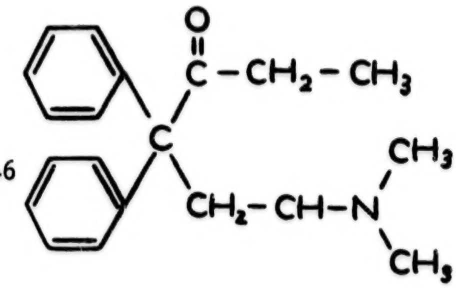
Adanon(Winthrop); Amidone; Dolophin(Lilly); Methadon; Methajade (M.S.&D.); Physeptone (B.W.); 4,4-diphenyl-6-dimethylaminoheptanone; 6-dimethylamino-4, 4-diphenyl-3-heptanone; 1,1-diphenyl-1-(2-dimethyl-aminopropyl)-3-heptanone; Schedule II; written Rx; CSA Code #-9250; Import/Export permits required.

This synthetic compound identified by the above trade names was discovered in Germany and known generically as Amidone, (Polamidon-Hoechst). It was introduced to the United States in 1945 by American technical investigators who were conducting post war studies of developments in medicinal chemistry achieved by the Germans during World War II. The compound was identified in the United States as "Methadon" a name adopted by the Council on Pharmacy and Chemistry of the American Medical Association. The process for producing this compound was made available to the American pharmaceutical industry in July, 1945. Several syntheses have been published. The most common procedure utilizes diphenyl-lacetonitrile and 1-dimethyl-amino-2-chloropropane as the interacting starting compounds. While it bears no chemical relationship to morphine or other opium derivatives, it was designed for use as a substitute for morphine in analgesia. After several American pharmaceutical firms had experimentally produced quantities of the drug for clinical evaluation, the United States Public Health Service, Lexington, Kentucky, in the spring of 1946 commenced extensive studies of its pharmacological actions. They found it to possess addictive liabilities similar to morphine. It was brought under control as an opiate by Presidential Proclamation No. 2738 on July 31, 1947.

The Food and Drug Administration has approved its use for the "maintenance" of addiction. The drug is used as the racemic isomer (dl) in the hydrochloride salt. The dextro isomer being highly insoluble, possesses little or no activity is considered practically inert and is seldom used.

9. METHADONE CON'T.

$C_{21}H_{27}NO$

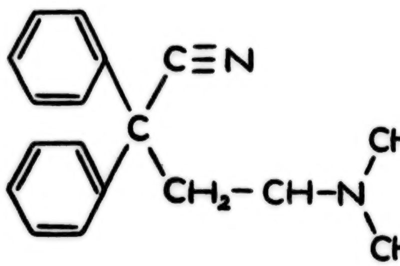


Molecular weight - 309.20

HCL - Percentage of anhydrous base - 89.46

10. METHADONE INTERMEDIATE
4-cyano-2-dimethylamino-4, 4-diphenylbutane; Schedule II; however, is without medical utility; CSA Code #-9254; Import/Export permits required.

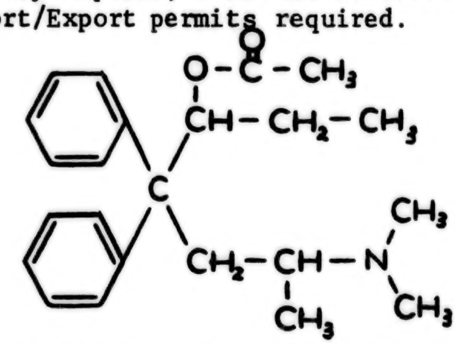
$C_{19}H_{22}N_2$



Molecular weight - 278.38

11. METHADYL ACETATE
Acetylmethadol; 6-dimethylamino-4, 4-diphenyl-3-heptanol acetate; 4, 4-diphenyl-6-dimethylamine-3-acetozy-heptane; a methadone derivative; Schedule I; CSA Code #-9601; Import/Export permits required.

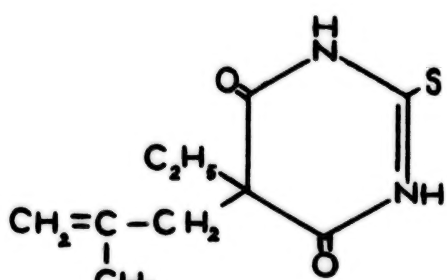
$C_{23}H_{31}NO_2$



Molecular weight - 353.49

12. METHALLATAL
5-ethyl-5-(2-methylallyl)-2-thiobarbituric acid; Miosidal; V-12; Schedule III; CSA Code #-2100; Form 236.

$C_{10}H_{14}N_2O_2S$



Molecular weight - 226.29

13. METHAMPHETAMINE
(+)-N, alpha-dimethylphenethylamine; a phenethylamine derivative; d-deoxyphedrine; Schedule II; written Rx; CSA Code #-: injectable-1400; other forms-1105; Import/Export permits required.

$C_{10}H_{15}N$

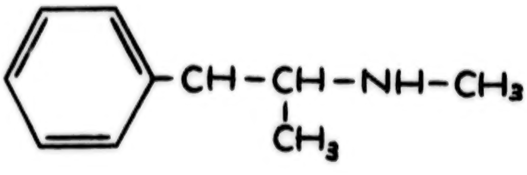
Molecular weight - 149.237

Percentage of anhydrous bases:

HCL - 80.35

Pot. Saccharate - 41.51

SO_4 - 60.84



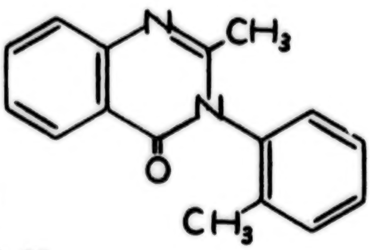
14. METHAQUALONE
2-methyl-3-o-tolyl-4(3H)-quanazolinone; Dormigoa; Dormutil; Dorsedin; Hyminal; Motolon; Melsedin; Mollinox; Parminal; Quaalude; Revonal; Parest; Somnium; Rorer-148; Sonal; Somberol; Tuazole; Schedule II; written Rx; CSA Code #-2565; Import/Export permits required.

$C_{16}H_{14}N_2O$

Molecular weight - 250.29

HCL - Percent of anhydrous base - 87.28

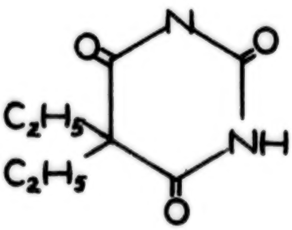
Sulfate - Percent of anhydrous base - 71.87



15. METHARBITAL
5,5-Diethyl-1-methylbarbituric acid; Schedule III; CSA Code #-2100; oral Rx; Form 236.

$C_9H_{14}N_2O_3$

Molecular weight - 198.22



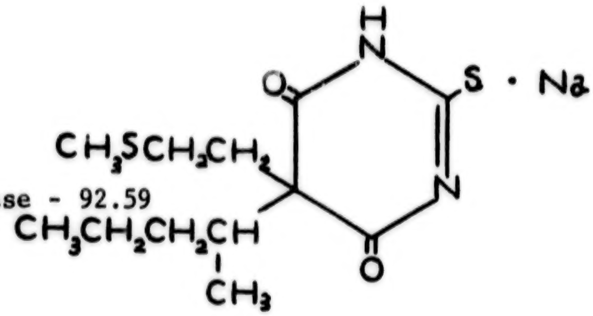
16. METHITURAL

5-(1-methylbutyl)-5/2-methylthio)ethyl/-2-thio-barbituric acid; Schedule III; oral Rx; Form 236.

$C_{12}H_{19}N_2O_2S$

Molecular weight - 310.42

Na Salt - Percentage of anhydrous base - 92.59

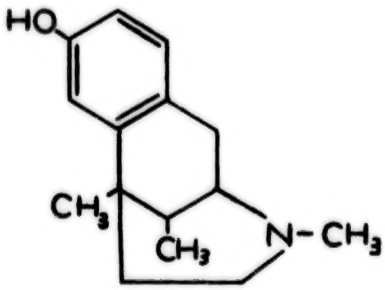


17. METHOBENZORPHAN *

Metazocine; N.I.H -7539; a morphinan derivative; 2'-hydroxy-2, 5,9-trimethyl/-6,7-benzomorphan/; Schedule I; CSA Code #-9240; Import/Export permits required.

$C_{15}H_{21}NO$

Molecular weight - 231.34



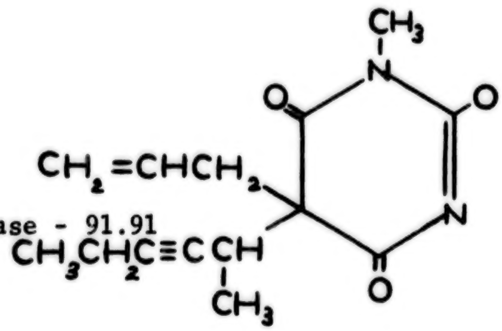
18. METHOHEXITAL

5-allyl-1-methyl-5-(1-methyl-2-pentynyl)barbituric acid sodium salt; A barbituric acid derivative; Brevital; Schedule IV; oral Rx; CSA Code #-2264; Form 236.

$C_{14}H_{17}N_2NaO_3$

Molecular weight - 284.30

Na Salt - Percentage of anhydrous base - 91.91

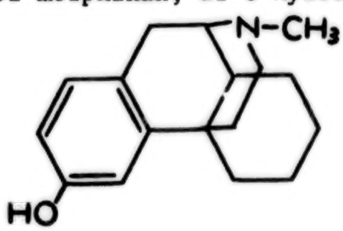


19. METHORPHAN

Racemethorphan; the racemic isomer of morphinan; dl-3-hydroxy-n-methyl morphinan.

$C_{17}H_{23}NO$

Molecular weight - 257.33

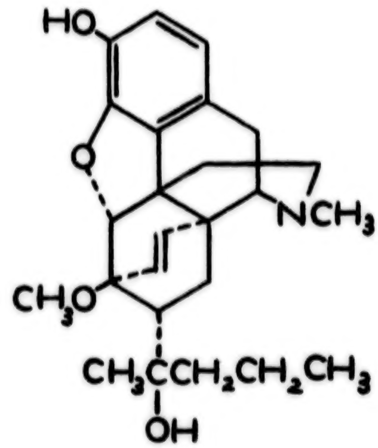


*Corrigendum-Included in Schedule II(b) of the Law. However, it has no currently accepted medical use in treatment in the United States.

20. *3-METHOXY-6, 14-ENDO-ETHENO-5,7,8,8-TETRAHYDRO-7(2-HYDROXYPENT-2-YL)ORIPAVINE
M-53, Etorphine-3-methylether; Schedule I; CSA Code #-9057; Import/Export permits required.

$C_{26}H_{35}NO_4$

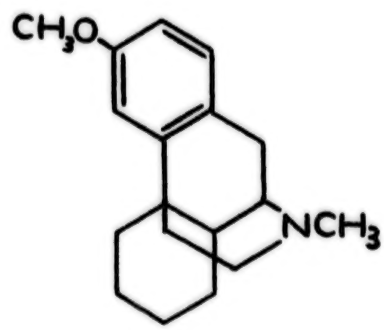
Molecular weight - 425.58



21. 3-METHOXY-N-METHYL-METAMORPHINAN
Schedule I; No CSA Code assigned; Import/Export permits required.

$C_{18}H_{21}NO$

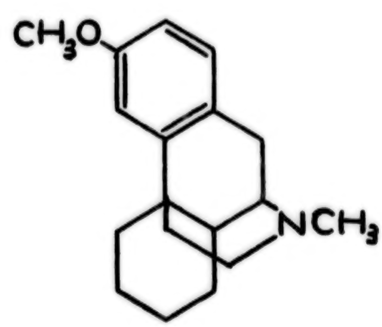
Molecular weight - 265.17



22. (-)1-3-METHOXY-N-METHYLMORPHINAN
Levomethorphan; (-)-3-methoxy-n-methylmorphinan; Schedule I; CSA Code #-9210; Import/Export permits required.

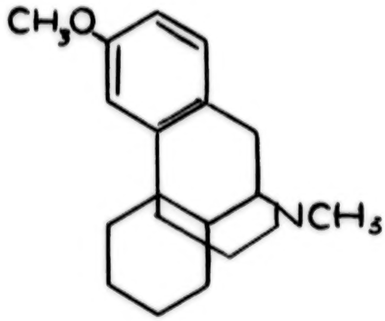
$C_{18}H_{25}NO$

Molecular weight - 271.38



*Corrigendum-Not listed in any schedule of the Law. However, it has no currently accepted medical use in treatment in the United States, and is controlled under the Single Convention.

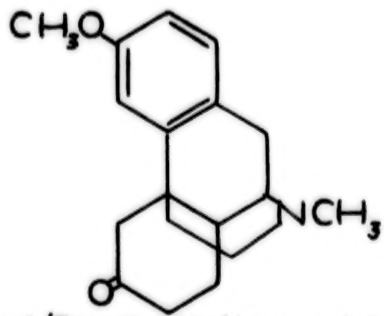
23. *(±)-3-METHOXY-N-N-METHYLMORPHINAN
Racemethorphan; Schedule I; CSA Code #-9730; Import/Export permits required.



$C_{18}H_{25}NO$

Molecular weight - 271.38

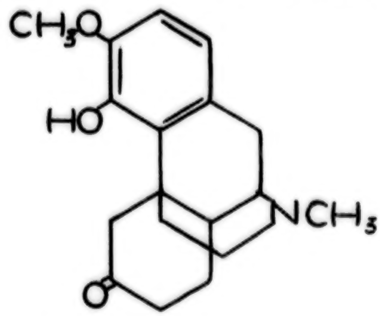
24. 3-METHOXY-6-OXO-N-METHYL MORPHINAN
Schedule I; No CSA Code Assigned; Import/Export permits required.



$C_{18}H_{21}NO_2$

Molecular weight - 281.16

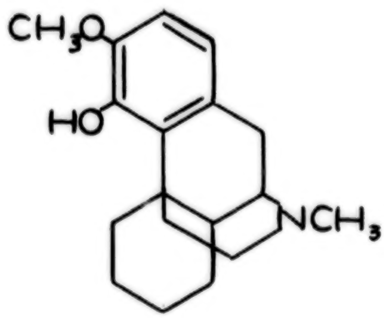
25. METADIHYDROTHEBAINONE
Schedule I; No CSA Code assigned; Import/Export permits required.



$C_{18}H_{22}NO_3$

Molecular weight - 298.11

26. 3-METHOXY-4-HYDRO-N-METHYL-METAMORPHINAN
Schedule I; No CSA Code assigned; Import/Export permits required.



$C_{18}H_{22}NO$

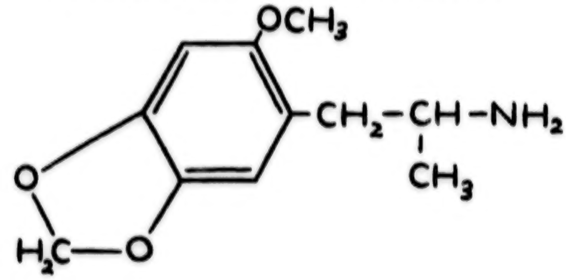
Molecular weight - 258.17

*Corrigendum-Included in Schedule II(b) of the Law. However, it has no currently accepted medical use in treatment in the United States.

27. 5-METHOXY-3, 4-METHYLENEDIOXY AMPHETAMINE
MMDA; Schedule I; CSA Code #-7401; Import/Export permits required.

$C_{11}H_{15}O_3N$

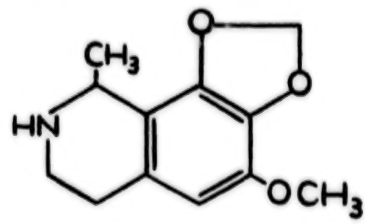
Molecular weight - 209.25



28. 8-METHOXY-6,7-METHYLENIDIOXY-1-METHYLTETRAHYDROISOQUINOLINE
Anhalonine, derived from the peyote plant; Schedule I; CSA Code #-7419; Import/Export permits required.

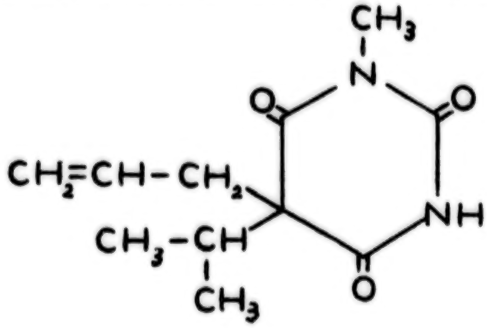
$C_{12}H_{15}NO_3$

Molecular weight - 221.25



29. 1-METHYL-5-ALLYL-5-ISOPROPYLBARBITURIC ACID
Enallylpropymal; Narconumal; Schedule III; CSA Code #-2100; Form 236.

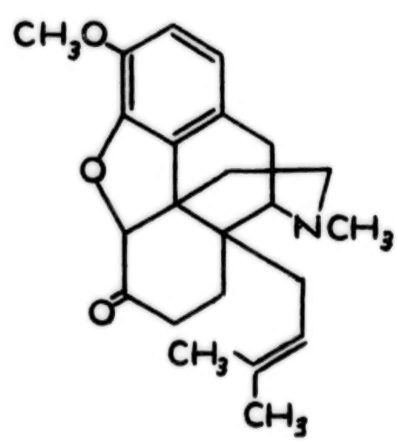
$C_{11}H_{16}N_2O_3$



30. 14-(3-METHYLCROTYL)CODEINONE
A thebaine derivative; Schedule I; No CSA Code assigned; Import/Export permits required.

$C_{23}H_{27}NO_3$

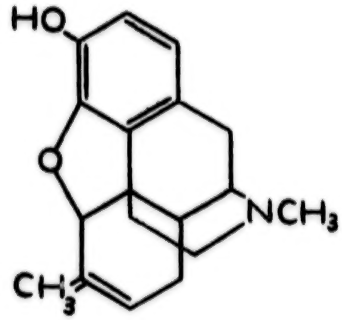
Molecular weight - 365.45



31. METHYLDESORPHINE
6-methyl-Δ^{6}-desomorphine; Schedule I; CSA Code #-9302; Import/ Export permits required.

$C_{18}H_{21}NO_2$

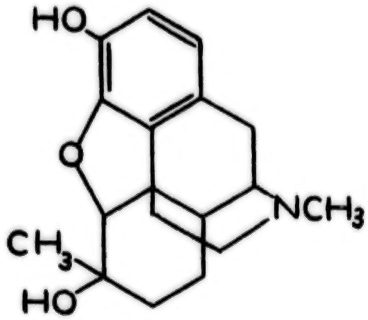
Molecular weight - 283.17



32. METHYLDIHYDROMORPHINE *
6-methyldihydromorphine; Schedule I; CSA Code #-9304; Import/ Export permits required.

$C_{18}H_{23}NO_3$

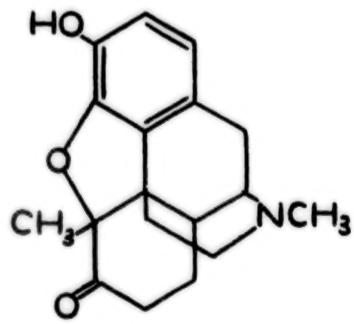
Molecular weight - 301.37



33. METHYLDIHYDROMORPHINONE **
Metopon; SN-dimethyl-3-hydroxy-6-oxo-4, 5-epoxymorphinan; Schedule I; CSA Code #-9260; Import/Export permits required.

$C_{18}H_{21}NO_3$

Molecular weight - 299.36

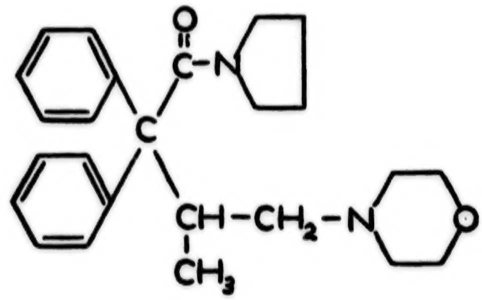


*Corrigendum-Spelled "Methylhydromorphine" in the Law.
**Corrigendum-Not listed in any schedule of the Law. However, it has no currently accepted medical use in treatment in the United States and is controlled under the Single Convention.

34. (-)-3-METHYL-2, 2-DIPHENYL-4-MORPHOLINO-BUTYRYL-PYRROLIDINE
Levomoride; Schedule I; CSA Code #-9629; Import/Export permits required.

$C_{25}H_{32}N_2O_2$

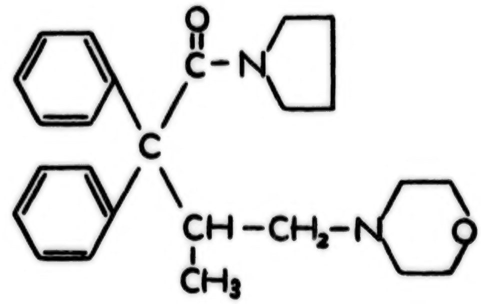
Molecular weight - 392.55



35. (+)-3-METHYL-2, 2-DIPHENYL-4-MORPHOLINO-BUTYRLPYRROLIDINE
Racemoramide; R-610; Schedule I; CSA Code #-9645; Import/Export permits required.

$C_{25}H_{32}N_2O_3$

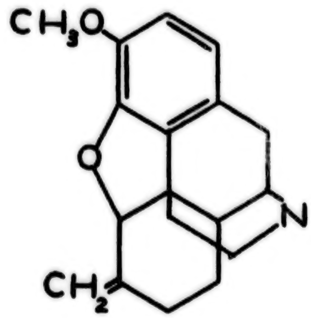
Molecular weight - 392 55



36. 6-METHYLENEDIHYDRODESOXYCODEINE
A dihydrocodeinone derivative; Schedule I; No CSA Code assigned; Import/Export permits required.

$C_{19}H_{23}NO_2$

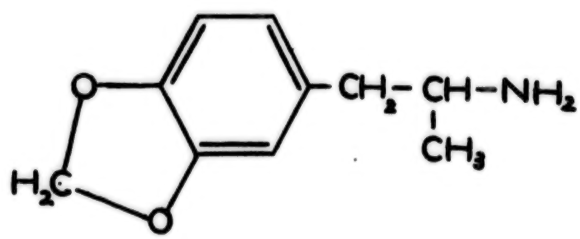
Molecular weight - 297.40



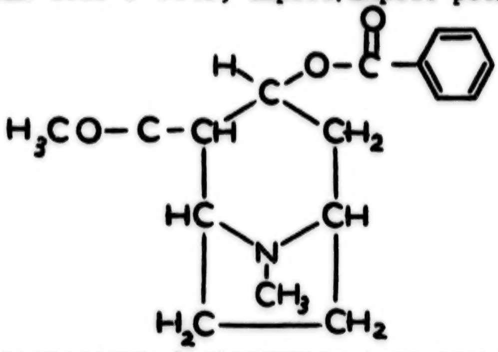
37. 3,4-METHYLENEDIOXY AMPHETAMINE
MDA; Schedule I; CSA Code #-7400; Import/Export permits required.

$C_{10}H_{13}O_2N$

Molecular weight - 179.22



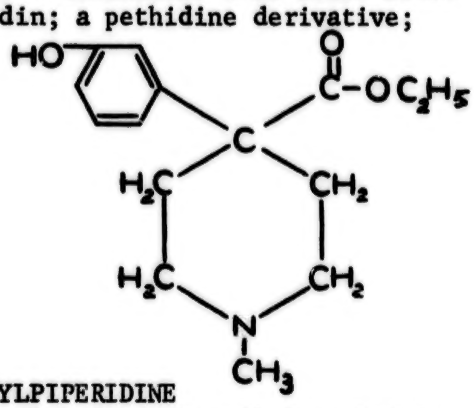
38. METHYL ESTER OF BENZOYLECGONINE
Cocaine; an alkaloid found in coca leaves or prepared by snythesis from ecgonine; Schedule II; CSA Code #-9041; Import/Export permits required.



$C_{17}H_{21}NO_4$

Molecular weight - 303.35

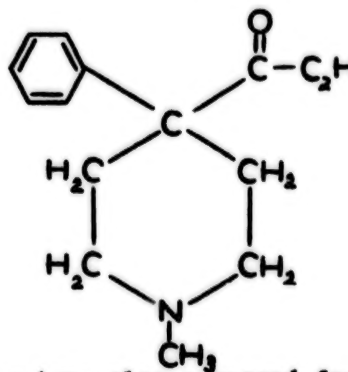
39. 1-METHYL-4-(3-HYDROXYPHENYL)-PIPERIDINE-4-CARBOXYLIC ACID ETHYL ESTER
Hydroxypethidine; Bemidone; Oxypetidin; a pethidine derivative; CSA Code #-9627.



$C_{15}H_{21}NO_3$

Molecular weight - 263.33

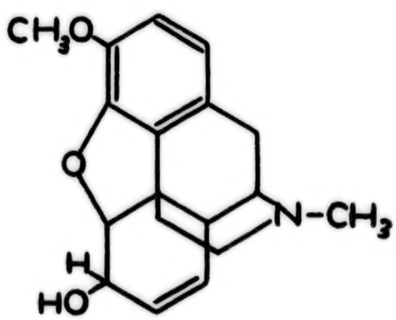
40. 1-METHYL-4-METAHYDROXYPHENYL-4-PROPIONYLPIPERIDINE
Cliradon; Ketagan; Ketobeonidone; 4-(3-hydroxyphenyl)-1-methyl-4-piperidyl ethyl Ketone; Schedule I; CSA Code #-9628; Import/Export permits required.



$C_{15}H_{21}NO_2$

Molecular weight - 247.33

41. METHYLMORPHINE
Codeine; a natural occuring alkaloid in opium; also prepared from morphine by selective methylation. Approximately 95% of all morphine produced in the U.S.A. is converted to codeine. See Codeine preparations for Schedule III and V products.

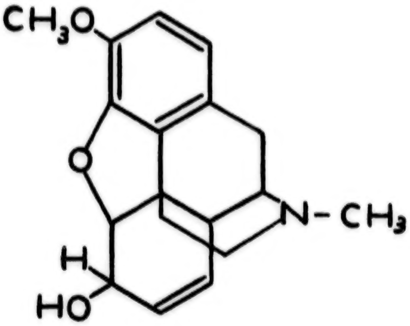


$C_{18}H_{21}NO_3$

Molecular weight - 317.19

42. METHYLMORPHINE

Codeine; the methyl ether of morphine; occurs naturally in opium also prepared synthetically from morphine. See codeine; Schedules II, III and V

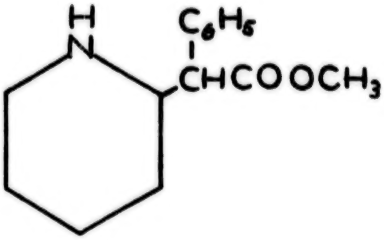


$C_{18}H_{21}NO_3 \cdot H_2O$

Molecular weight - 317.19

43. METHYLPHENIDATE

Alpha-phenyl-2-piperidine acetic acid methyl ester; methyl phenidylacetate; Ritalin; Schedule II; written Rx; CSA Code #-1726.



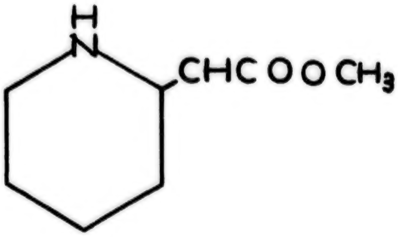
$C_{14}H_{19}O_2$

Molecular weight - 233.30

HCL - Percentage of anhydrous base - 86.50

44. METHYL PHENIDYLACETATE

Alpha-phenyl-2-piperidine acetic acid methyl ester; methylphenidate; Ritalin; Schedule II; written Rx; CSA Code #-1726; Import/Export permits required.



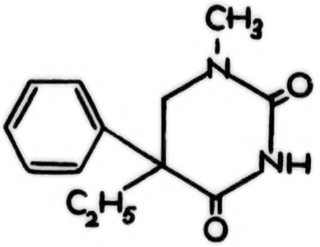
$C_{14}H_{19}O_2$

Molecular weight - 233.30

HCL - Percentage of anhydrous base - 86.50

45. METHYL PHENOBARBITAL

5-ethyl-n-methyl-5-phenylbarbituric acid; Barbiphaneal; Barbiphenal; Isonal; Mebaral; Mephobarbital; Mephytal; Prominal; Promitone; Protheonal; Schedule III; CSA Code #-2100; Form 236.



$C_{13}H_{14}N_2O_3$

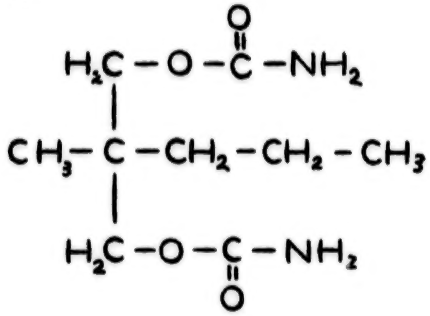
Molecular weight - 246.26

46. 2 METHYL-2-N-PROPYL-1, 3-PROPANEDIOL DISCARBAMATE
Carbamic acid 2-methyl-2-propyltrimethylene ester; meprobamate; Schedule IV; CSA Code #-2820; Form 236. Manufactured and/or distributed under generic and several trade names.

$C_9H_{18}N_2O_4$

Molecular weight - 218.25

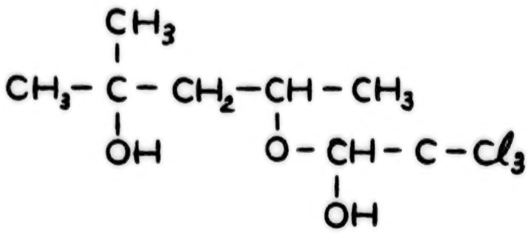
Percentage of anhydrous base - 100



47. 2-METHYL-4-(2,2,2-TRICHLORO-1-HYDROXYETHOXY-2-PENTANOL)
Chlorhexadol; Schedule III; oral Rx; Form 236.

$C_8H_{15}CL_3O_3$

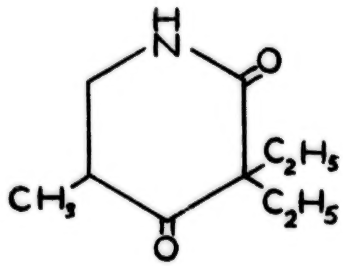
Molecular weight - 265.58



48. METHYPRYLON
Nodilar, (Roche); 3,3-diethyl-5-methyl-2, 4-piperidinedione; Schedule III; oral Rx; Form 236.

$C_{10}H_{17}NO_2$

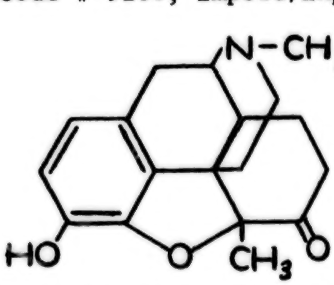
Molecular weight - 183.25



49. METOPON*
Methyldihydromorphinone; a thebaine derivative; prepared from dihydrocodeinone enol acetate; SN-dimethyl-3-hydroxy-6-oxo-4,5-epoxymorphinan; Schedule I; CSA Code #-9260; Import/Export permits required.

$C_{18}H_{21}NO_3$

Molecular weight - 299.36



*Corrigendum Not listed in any schedule of the Law. However, it has no currently accepted medical use in treatment in the United States and is controlled under the Single Convention.

306-877 O - 79 - 12

50. MIXED ALKALOIDS OF OPIUM

Pantopon, Spasmalgin(Roche); Schedule II; written Rx; CSA Code #-9648; Import/Export permits required. The extraction procedure for preparing mixed alkaloids of opium is as follows:

EXTRACTION PROCEDURES FOR MIXED ALKALOIDS OF OPIUM

A specific quantity of gum opium is subjected to grinding and macerating with water. This opium and water mixture is strained and the gum opium placed in a small press and all the water is extracted. This pressed opium is again macerated with water, strained and pressed again. This process is repeated five times. The residual mass is then tested and if free of alkaloids is discarded.

The liquors resulting from the five washings of the opium are then collected and concentrated in a vacuum still. This concentration is then treated with calcium chloride which precipitates most of the morphine and some codeine. These alkaloids are separated and the morphine is subjected to three or four recrystallizations and acidifications. The material is then cut into cubes and placed in a drier. Upon drying, the impurities rise and accumulate on the surface as a brown scum. This encrustation is scraped off and there remains white blocks or cubes of morphine hydrochloride.

The mother liquors from the morphine precipitation process is treated with chloroform to precipitate [illegible] quantity of naturally occurring codeine. This chloroform mixture is then treated with dilute hydrochloric acid; the codeine passes from the chloroform to the water and acid thus forming a solution of codeine hydrochloride.

This solution is subjected to three recrystallizations until it is free of impurities.

The mother liquor, after the morphine and codeine have been extracted, is then treated with ammonia water which precipitates the noscapine, papaverine, thebaine and other minor alkaloids. After these have precipitated, the mother liquors are shaken out with chloroform, to pick up any traces of unprecipitated alkaloids and is then discarded. The chloroform is then shaken out with hydrochloric acid and water. This concentrated acid solution is returned to the process.

The mixed alkaloids, i.e., the noscapine, papaverine, thebaine, etc., are treated with hot alcohol. The noscapine which is the least soluble is the first to be precipitated. This is collected and subjected to several recrystallizations from alcohol. After the noscapine has been extracted, the resultant liquor is concentrated and cooled again whereupon the papaverine alkaloid crystallizes and is collected. This too, is subjected to several recrystallizations. The liquors are again concentrated and cooled at which time all the thebaine and the minor alkaloids are crystallized and collected. In other words, the entire process of separation, with the exception of the morphine and codeine, is based upon the difference in the solubility of the various alkaloids in alcohol. The least soluble being noscapine, the next is papaverine and the next is thebaine and other minor alkaloids.

After the entire run of opium has been accomplished and all the opium alkaloids have been recovered, the alkaloids are mixed together

in the same proportion as they occur in opium. Sometimes the yield of a particular alkaloid may be low, in which case a quantity of the alkaloid is obtained from a subsequent run and added to meet required standards. Generally, all alkaloids from a specific run are admixed to insure the same percentage as they existed in the opium and to produce a product of uniform color and pharmaceutical elegance.

The manufacturer, (Roche) describes the product "Pantopon" as containing all the alkaloids of opium (in the hydrochloride form) in a highly purified form free from inert matter-waxes gums, resins- and in approximately the same ratio in which they occur in nature. Its action is essentially that of opium. It exhibits, therefore, in addition to the action of morphine, the action of codeine, papaverine and other alkaloids present in opium.

MIXED ALKALOIDS OF OPIUM - MANUFACTURING DIAGRAM

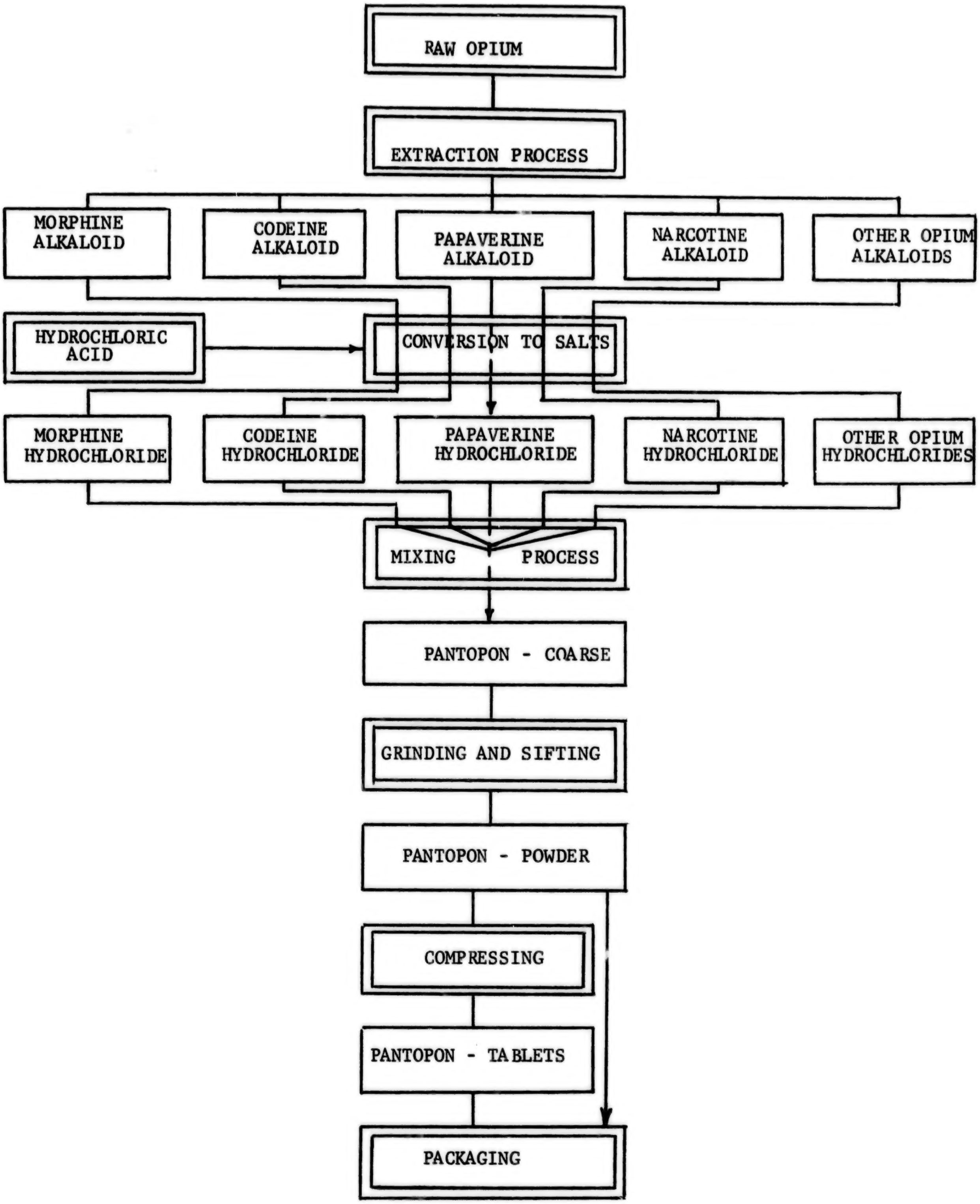


PLATE NO. 4

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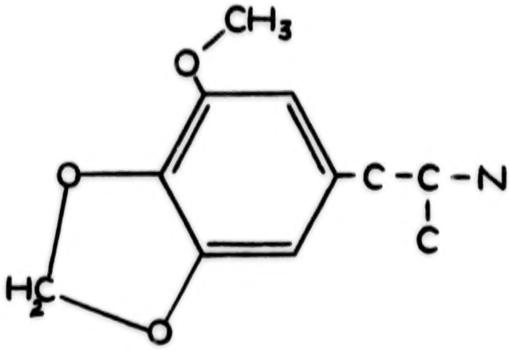
51. MMDA

5-Methoxy-3, 4-Methylenedioxy amphetamine. Schedule I; CSA Code #-7401; Import/Export permits required.

$C_{11}H_{15}O_3N$

Molecular weight - 209.25

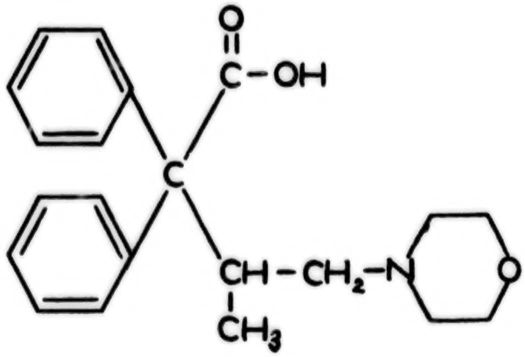


52. MORAMIDE-INTERMEDIATE *

2-methyl-3-morphinolino-1, 1-diphenyl-propane-carboxylic acid; Schedule I; CSA Code #-9802; Import/Export permits required.

$C_{21}H_{25}NO_2$

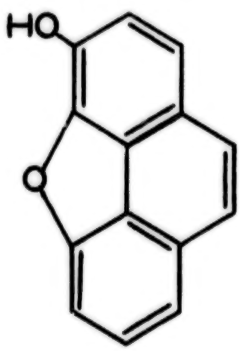
Molecular weight - 339.44



53. MORPHENOL

A phenolic product formed by the demethylation of methylmorphenol. Schedule I; NO CSA Code assigned; Import/Export permits required.

$C_{14}H_8O_2$



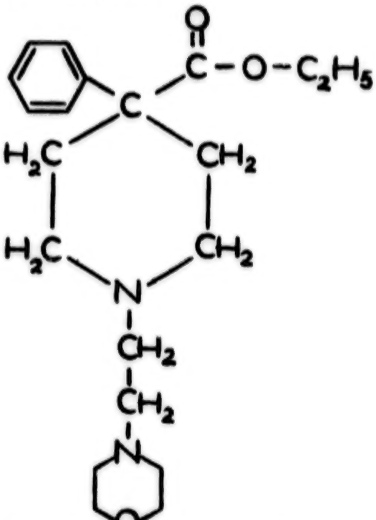
* Corrigendum-Included in Schedule II(b) of the Law. However, it has no currently accepted medical use in treatment in the United States.

54. MORPHERIDINE

Morpholinoethylnorpethidine; a pethidine derivative; 1-(2-morpholinoethyl)-4-phenylpiperidine-4-carboxylic acid ethyl ester; Schedule I; CSA Code #-9632; Import/Export permits required.

$C_{20}H_{30}N_2O_3$

Molecular weight - 346.25

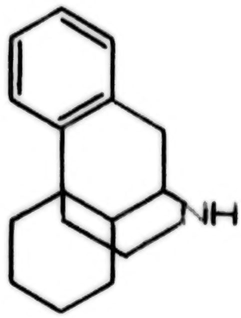


55. MORPHINAN

CIS 1,3,4,9,10,10a-hexahydro-2H-10, 4a-iminoethanophenanthrene; parent substance of levomethorphan, dextromethorphan and racemethorphan; Schedule I; No CSA Code assigned.

$C_{16}H_{21}N$

Molecular weight - 227.34

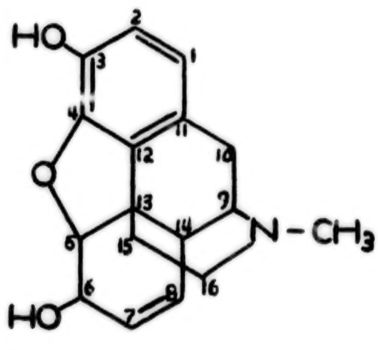


56. MORPHINE

The principal phenanthrene alkaloid of opium, constituting 12% to 15% of its weight. Schedule II; written Rx; CSA Code #-9300; Import/Export permits required.

$C_{17}H_{19}NO_3 \cdot H_2O$

Molecular weight - 303.17



57. MORPHINE

Schedule III; oral Rx; CSA Code #-9810; Import/Export permits required. Not more than 50 milligrams of morphine per 100 milliliters (228 grains per 29.573 cc) or per 100 grams with one or more active, non-narcotic ingredients in recognized therapeutic amounts.

Extraction Processes for Morphine and other Opium Alkaloids

Usually 300 pounds of gum opium are chopped into small chunks and placed in a large wooden tank equipped with a heavy iron roller in the bottom. Hot water is added. The iron roller in rotating crushes all the chunks of opium and thoroughly mixes the opium with water. This mixture is then drawn off and filtered through cloth. The opium remaining on the filter is then subjected to six additional washings with water which thoroughly exhaust the gum opium. The residue is tested and if free of alkaloids is discarded. The first three washings of the opium then enter the process. The fourth washing becomes the first water used in the next run, the fifth the second, and so on. The second and third water washings are placed in a vacuum still and the volume greatly reduced, and, lastly, the first water extraction is combined in this still to be concentrated. The object of this process being that the liquors which are richest in alkaloids are subjected to the least amount of heat.

When the proper degree of concentration has been obtained, the residue in the still is run into a large porcelain lined vat and ammonia and alcohol is added. This process precipitates the alkaloids. The alcohol picks up the codeine, thebaine, isoquinoline alkaloids and other minor alkaloids. The morphine and noscapine are not soluble in the

alcohol/ammonia mixture and must be separated with acid and water. The mixture containing codeine, thebaine, etc., is then filtered; the morphine and noscapine remaining on the filter cloth are then dissolved in a solution of acid and water and filtered. The morphine is soluble in this solution and passes through the cloth; however, the noscapine is insoluble and remains on the cloth. The noscapine is collected, dried, stored and later crystallized for export to Japan, Germany and the Netherlands while small quantities are used domestically in cough preparations.

The acid solution of morphine is then treated with ammonia which precipitates the crude morphine alkaloid. Three batches of opium are run through to this point before further purification of the morphine is carried on. The crude alkaloid is about 70% pure at this point and is referred to as SPMA (semi-purified morphine alkaloid).

The morphine alkaloid is then dissolved in a solution of hot sulfuric acid and water, filtered thourgh charcoal and crystallized. It is then subjected to three more recrystallizations when a pure product is obtained. The last recrystallization is in a lead lined container. When all the mother liquors have been drained off, cubes are cut from this box (each cube weighing about one kilogram when dry) and placed in a drying oven. The heat causes all impurities to come to the surface of these cubes in the form of a brown scum. When thoroughly dried, this brown encrustation is then scraped off. These blocks of morphine are then placed in a cutting device and cut into proper sized cubes or else powdered and sifted through a seive of proper dimensions. The mother

liquors from the above recrystallizations are precipitated with ammonia; the precipitate collected and saved. When a lot of this precipitate has been collected it is purified as the sulfate and finally returned to the alkaloid stage again by the addition of ammonia. This alkaloid is used for conversion into codeine.

To return to the point in the extraction process where the morphine and noscapine are precipitated and retained in the filter press, and the codeine and other alkaloids remain in the alcoholic solution. The filtrate is pumped to a still and the alcohol recovered. While still hot the residue in the still is run into an open kettle where it is allowed to cool. When cool the supernatant liquid is poured off leaving a heavy tarry substance. This heavy tarry sedimentation contains the thebaine and papaverine.

The liquid portion which was poured off in the above step then goes to an extractor. The liquid is rendered alkaline with sodium carbonate and shaken with a solvent, five extractions being made. This frees the aqueous solution of all alkaloids. This solvent then goes to another extractor where it is extracted with acid and water, the alkaloid going into the aqueous solution and the solvent returned to the storage tanks for further use in the next lot. The acid solution of alkaloids from the above separation then goes into a kettle and from there to a small vacuum pan where the solution is concentrated and a mixture of codeine and morphine are allowed to crystallize out. This crystallization is a dark tarry mass.

The mixed salts of codeine and morphine are then treated with a solvent to remove all the tars and the solvent is sent to a still and the liquid portion recovered for further use in the next lot. The mixture of alkaloids in water are now straw colored and an excess of sodium hydroxide is now added. This mixture is now placed in a small extractor and treated with a solvent. The solvent picks up all the codeine, the morphine combines with the sodium hydroxide forming sodium morphinate which remains in solution (in the water layer). The solvent containing the codeine is shaken with hot water and sulfuric acid. The acid solution containing the codeine is then treated with sodium hydroxide which precipitates the codeine in the form of alkaloidal base. The codeine alkaloid is collected by filtering the liquid, the alkaloid dried and sent to the codeine shop for further purification and crystallization.

The morphine soda liquor is then neutrallized with sulfuric acid which releases the morphine from the sodium and forms morphine sulfate. The solution of morphine sulfate is then filtered to remove any dirt; the filtrate is then precipitated with ammonia. The crude morphine alkaloid thus obtained is used for alkaloids in the synthetic codeine process.

Synthetic Codeine Process

Morphine alkaloid is mixed with solvent and the methylating agent is added. From this mixing tank the morphine alkaloid mixture runs into a retort which contains another solvent. This mixture is heated in the retort for 40 minutes at 132 degrees centigrade. This heating is necessary to remove one molecule of water. The residue in the retort is then brought up to the original volume by the addition of a fresh solvent

and then mixed with aqueous sodium hydroxide for ten minutes and then allowed to settle. The water containing the sodium hydroxide settles to the bottom and picks up all unconverted morphine alkaloid, and the codeine is contained in the supernatant liquid. This liquid is subjected to three washings to remove any traces of unconverted morphine (two of sodium hydroxide and one of water.) These washes are collected and neutralized with sulfuric acid, then precipitated by the addition of ammonia. The morphine alkaloid is collected by filtration and is included in the next lot of morphine alkaloid that is placed in the methylating process.

The solvent containing the codeine alkaloid is run to an extractor where it is shaken with hot sulfuric acid. This acid solution then runs out into an open kettle where it is allowed to crystallize. The crystallized codeine sulfate is then centrifuged, dried and weighed. This equals the codeine sulfate from one run or batch. The solvent is washed further with hot water until it is free from alkaloids. These water washings are concentrated in a pan (several batches at one time) and codeine sulfate crystallized out. The mother liquors from the above crystallizations are concentrated in a vacuum pan and another crop of crystals obtained. This concentration and recrystallization is followed as long as possible to obtain the maximum yield (until the mother liquors become too dark). When further recrystallization is impossible the mother liquors are rendered alkaline by the addition of sodium hydroxide and shaken out with benzole. This benzole solution is then treated with dilute sulfuric acid concentrated and a fresh crop of codeine sulfate crystals are obtained.

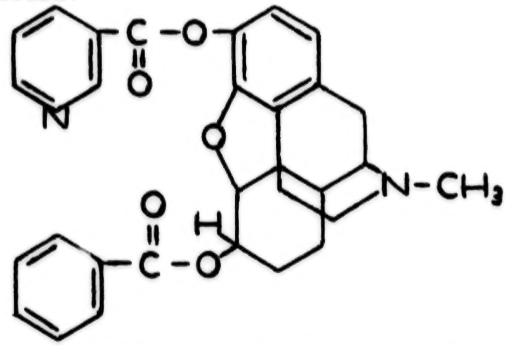
In making other salts of codeine, the codeine sulfate is dissolved in water, precipitated by the addition of ammonia. If the phosphate is desired, the alkaloid is dissolved in alcohol, phosphoric acid is added and codeine phosphate crystallizes out.

58. MORPHINE DINICOTINATE

Nicomorphine; morphine ester with nicotinic acid; Schedule I; CSA Code #-9313; Import/Export permits required.

$C_{29}H_{25}N_3O_5$

Molecular weight - 495.51



59. MORPHINE METHYLBROMIDE

A quarternary ammonium salt of morphine; morphosan; Schedule I; CSA Code #-9305; Import/Export permits required.

$C_{17}H_{19}NO_3 \cdot CH_3Br$

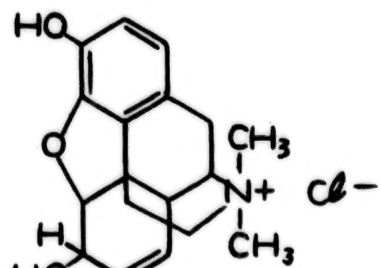
Molecular weight - 380.28

60. MORHINE METHYLCHLORIDE*

Schedule I; CSA Code #-9323; Import/Export permits required.

$C_{17}H_{19}NO_3CL$

Molecular weight - 335.64

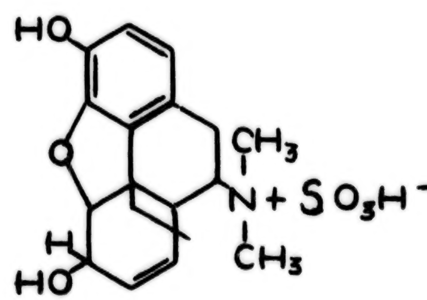


61. MORPHINE METHYLSULFONATE

A quarternary ammonium salt of morphine; Schedule I; CSA Code #-9306; Import/Export permits required.

$C_{17}H_{19}NO_3 \cdot CH_4SO_3$

Molecular weight - 381.26



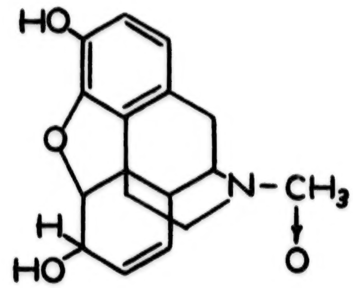
*Corrigendum-Not listed in any schedule of the Law. However, it has no currently accepted medical use in treatment in the United States and is controlled under the Single Convention.

62. MORPHINE-N-OXIDE

Genomorphine; N-oxymorphine; Schedule I; CSA Code #-9307; Import/ Export permits required.

$C_{17}H_{19}NO_4$

Molecular weight - 301.33

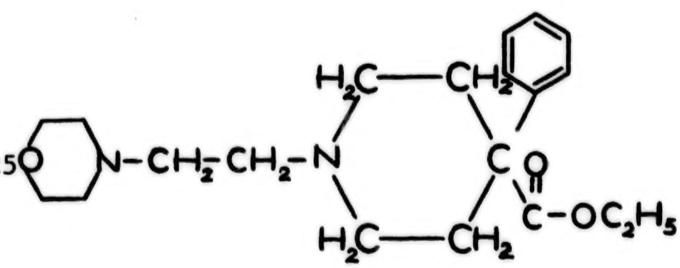


63. MORPHOLINOETHYLNORPETHIDINE

Morpheridine; 1-(2-morpholino-ethyl)-4-phenylpiperidine-4-carboxylic acid ethyl ester; Schedule I; CSA Code #-9632; Import/Export permits required.

$C_{20}H_{30}N_2O_3$

Molecular weight - 346.25

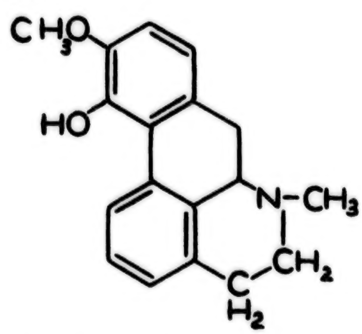


64. MORPHOTHEBAINE

A product resulting from the demethylation of thebaine by hydrochloric acid; 2,11-dihydroxy-10=methoxyaporphine.

$C_{18}H_{19}O_3N$

Molecular weight - 297.34

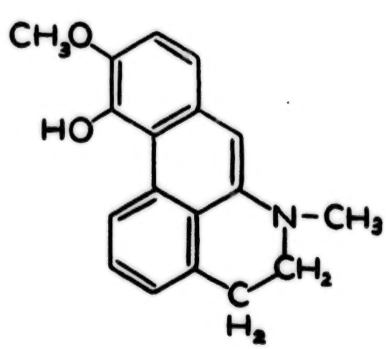


65. MORPHOTHEBAINE

A thebaine derivative; Schedule I; No CSA Code assigned; Import/ Export permits required.

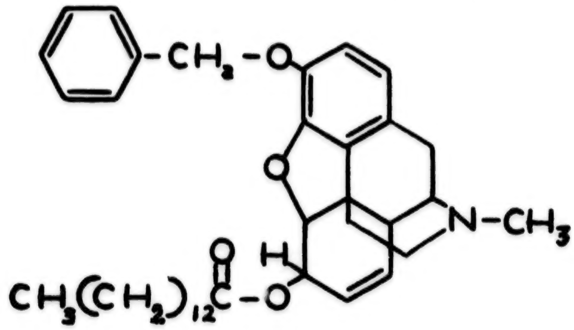
$C_{18}H_{19}O_3N$

Molecular weight - 297.34



66. MYROPHINE

Myristyl benzyl morphine; Schedule I; CSA Code #-9308; Import/Export permits required.

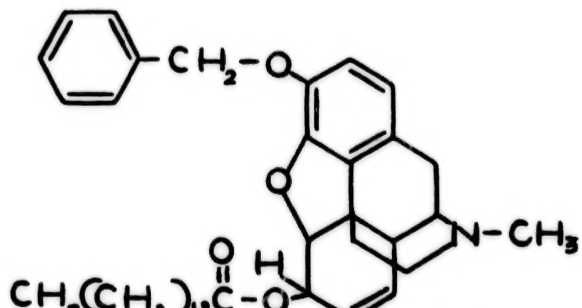


$C_{38}H_{50}NO_4$

Molecular weight - 584.78

67. MYRISTYL BENZYLMORPHINE

Myrophine; Schedule I; CSA Code #-9308; Import/Export permits required.

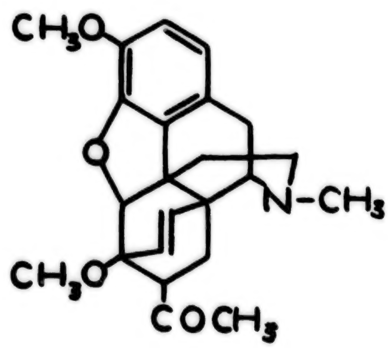


$C_{38}H_{50}NO_4$

Molecular weight - 584.78

68. M-39

6,14-Endoetheno-7-Acetyl-Tetrahydrothebaine; a thebaine derivative; Schedule I; No CSA Code assigned; Import/Export permits required.



$C_{23}H_{27}NO_4$

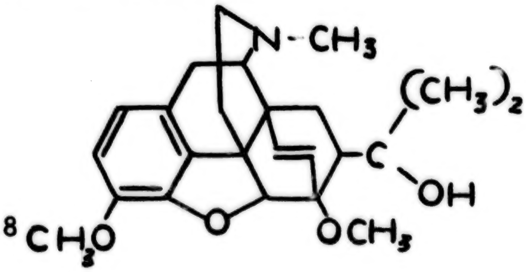
Molecular weight - 381.46

HCL - Percentage of anhydrous base - 91.2

HBr - Percentage of anhydrous base - 83.5

69. M-50

6,14-endoetheno-7-(2-hydroxy-2-propyl) tetrahydrothebaine; Schedule I; No CSA Code assigned; Import/Export permits required.



$C_{24}H_{31}NO_4$

Molecular weight - 397.50

HCL - Percentage of anhydrous base - 91.8

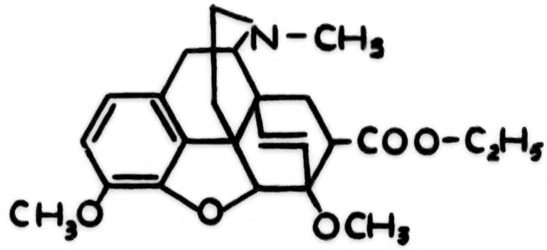
306-877 0 - 79 - 13

70. M-51 *

Carbethoxy-6, 14-endo-etheno-tetrahydrothebaine; a thebaine derivative No CSA Code assigned; Import/Export permits required.

$C_{24}H_{29}NO_5$

Molecular weight - 411.48

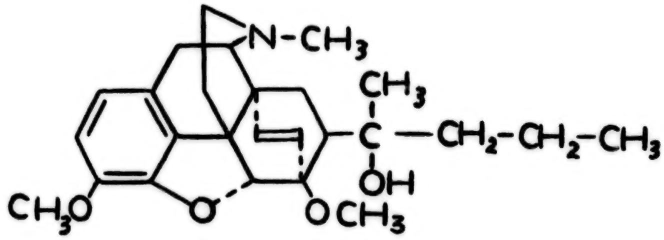


71. M-53*

Etorphine 3-methylether; 3-methoxy-6, 14-endo-etheno-tetrahydro-7 (2-hydroxypent-2yl) oripavine; Schedule I; CSA Code #-9057; Import/Export permits required.

$C_{26}H_{35}NO4$

Molecular weight - 425.58



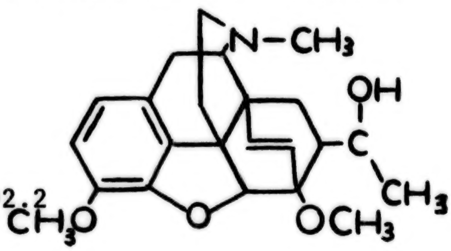
72. M-55, M-55A *

6, 14-endoetheno-7-(2-hydroxy-5-methyl-2-hexyl) tetrahydrothebaine; Schedule I; No CSA Code assigned; Import/Export permits required.

$C_{18}H_{29}NO_4$

Molecular weight - 443.52

HCL - Percentage of anhydrous base - 92.2



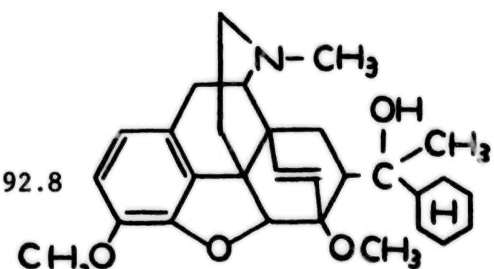
73. M-56, 14-ENDOETHENO-7-(1-HYDROXY-1-CYCLOHEXYL-1-ETHYL) TETRAHYDROTHEBAINE*

M-56A; a thebaine derivative; Schedule I; No CSA Code assigned; Import/Export permits required.

$C_{29}H_{39}NO_4$

Molecular weight - 465.61

HCL - Percentage of anhydrous base - 92.8



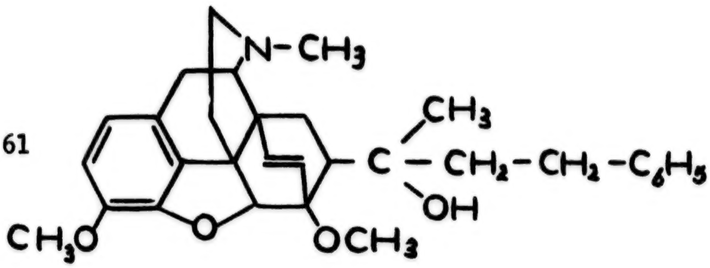
*Corrigendum-Not listed in any schedule of the Law. However, it has no currently accepted medical use in treatment in the United States, and is controlled under the Single Convention.

74. M-58

6, 14-endo-etheno-7-(2-hydroxy-4-phenyl-2-butyl) tetrahydrothebaine; Schedule I; No CSA Code assigned; Import/Export permits required.

$C_{31}H_{37}NO_4$

Molecular weight - 487.61

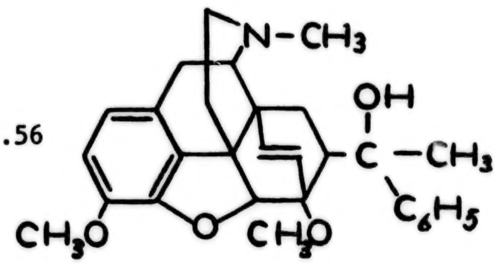


75. M-60, M-60A

6, 14- endoetheno-7-(1-hydroxy-1-phenyl-1-ethyl) tetrahydrothebaine; Schedule I; No CSA Code assigned; Import/Export permits required.

$C_{29}H_{33}NO_4$

Molecular weight - 459.56

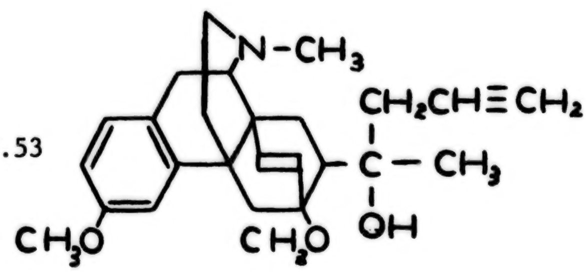


76. M-62, M-62A

6, 14-endo-etheno-7-(2-hydroxy-4-penten-2-yl) tetrahydrothebaine; Schedule I; No CSA Code assigned; Import/Export permits required.

$C_{26}H_{33}NO_4$

Molecular weight - 423.53

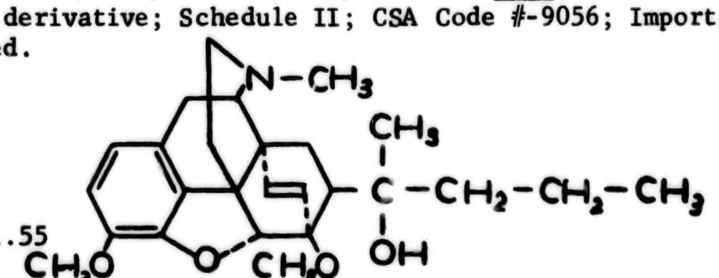


77. M-99 (ETORPHINE)

Tetrahydro-7, alpha (1-hydroxy-1-methylbutyl)-6, 14-endoetheno-oripavine; a thebaine derivative; Schedule II; CSA Code #-9056; Import/Export permits required.

$C_{25}H_{33}NO_4$

Molecular weight - 411.55



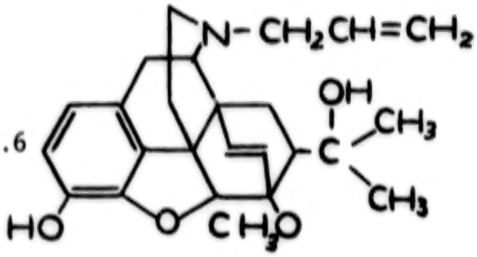
HCL - Percentage of anhydrous base - 91.85

78. M-159
N-allyl-6, 14-endoetheno-7-(2-hydroxy-2-propyl) tetrahydronororipavine; Schedule I; No CSA Code assigned; Import/Export permits required.

$C_{25}H_{31}NO_4$

Molecular weight - 409.51

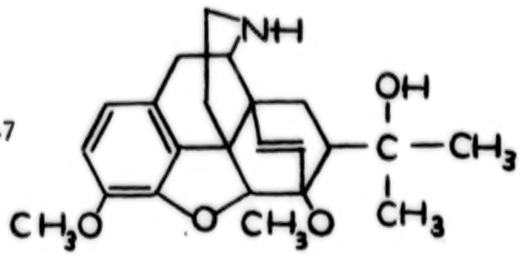
Hcl - Percentage of anhydrous base - 91.6



79. M-169
6, 14-endoetheno-7 alpha-(2-hydroxy-2-propyl) tetrahydronorthebaine; a thebaine derivative; Schedule I; No CSA Code assigned; Import/Export permits required.

$C_{23}H_{29}NO_4$

Molecular weight - 383.47

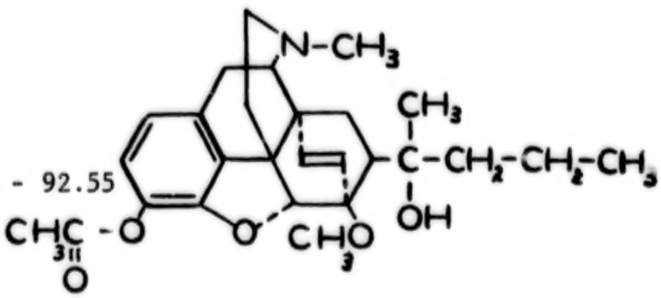


80. M-183
Acetorphine, the 3-0-acetyl-ester of Etorphine; 3-0-acetyltetrahydro 7(1-hydroxy-1-methylbutyl-6, 14-endoetheno-oripavine; a thebaine derivative. Also referred to as one of the "oripavine" group; Schedule I; CSA Code #-9319; Research only; Import/Export permits required.

$C_{27}H_{35}NO_5$

Molecular weight - 453.59

HCL - Percentage of anhydrous base - 92.55

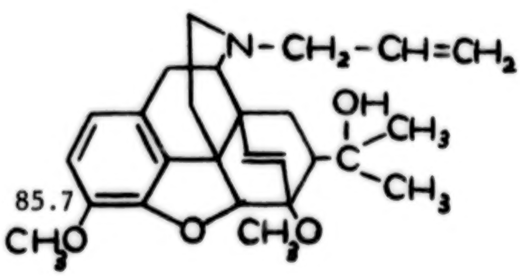


81. M-211
N-allyl-3-acetyl-6, 14-endo-etheno-7-(2-hydroxy-2-propyl) tetrahydronororipavine; a thebaine derivative; Schedule I; No CSA Code assigned; Import/Export permits required.

$C_{27}H_{33}NO_5$

Molecular weight - 435.54

HCL - Percentage of anhydrous base - 85.7

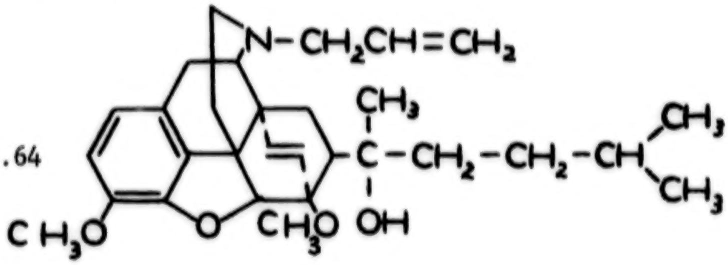


82. M-233

N-allyl-7-alpha-(1-hydroxy-1, 4-dimethylpentyl)-6,7,8,14-tetrahydro-6, 14-endo-ethenonorthebaine; a thebaine derivative; Schedule I; No CSA Code assigned; Import/Export permits required.

$C_{30}H_{41}NO_4$

Molecular weight - 479.64

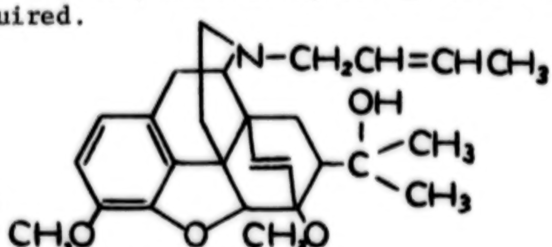


83. M-247

N-(2-butene-1-yl)-6, 14-endo-etheno-7-(2-hydroxy-2-butyl)-tetrahydronorthebaine; a thebaine derivative; Schedule I; No CSA Code assigned; Import/Export permits required.

$C_{28}H_{37}NO_4$

Molecular weight - 451.59



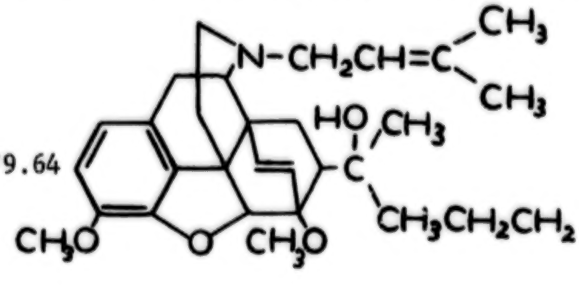
Bitratrate - Percentage of anhydrous base - 73.1

84. M-252

6, 14-endo-etheno-N-dimethallyl-7-(2-hydroxy-2-pentyl) tetrahydronorthebaine; Schedule I; No CSA Code Assigned; Import/Export permits.

$C_{30}H_{41}NO_4$

Molecular weight - 479.64

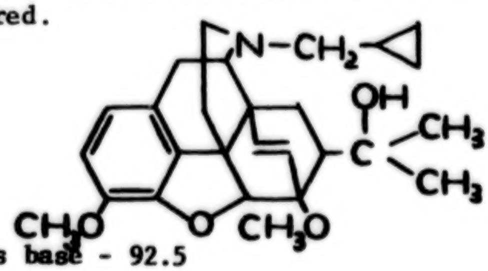


85. M-278

N-cyclopropylmethyl-6, 14-endo etheno-7-(2-hydroxy-2-propyl) tetrahydronorthebaine; a thebaine derivative; Schedule I; No CSA Code assigned; Import/Export permits required.

$C_{27}H_{35}NO_4$

Molecular weight - 437.56



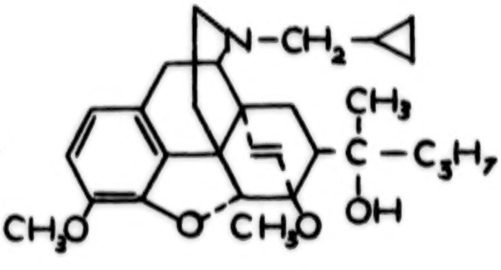
HCL -Percentage of anhydrous base - 92.5

-[redacted]-

86. M-281
N-cyclopropylmethyl-7, alpha-(1-hydroxy-1-methylbutyl)-6,7,8,14-tetrahydro-6, 14-endo ethenonorthebaine; a thebaine derivative; No CSA Code assigned; Import/Export permits required.

$C_{29}H_{39}NO_4$

Molecular weight - 465.61

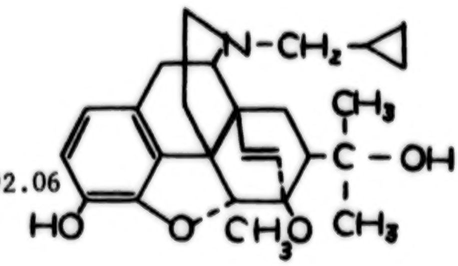


87. M-285 CYPRENORPHINE
N-(cyclopropylmethyl)-tetrahydro-7-alpha-(1-hydroxy-1-methylethyl)-6, 14-endo-ethenonororipavine; a thebaine derivative; Schedule II; CSA Code #-9054; Import/Export permits required.

$C_{26}H_{33}NO_4$

Molecular weight - 423.53

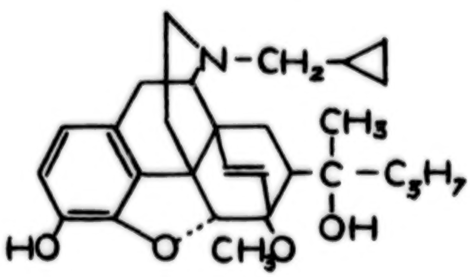
HCL - Percentage of anhydrous base - 92.06



88. M-289
N-cyclopropylmethyl-7-alpha-(1-hydroxy-1-methylbutyl)-6,7,8,14-tetrahydro 6, 14-endo-ethenonororipavine; a thebaine derivative Schedule I; No CSA Code assigned; Import/Export permits required.

$C_{28}H_{37}NO_4$

Molecular weight - 451.58

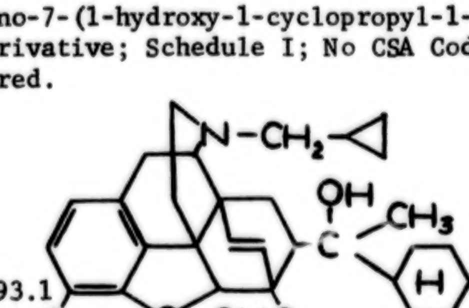


89. M-306
N-cyclopropylmethyl-6, 14-endoetheno-7-(1-hydroxy-1-cyclopropyl-1-ethyl) tetrahydronororipavine; a thebaine derivative; Schedule I; No CSA Code assigned; Import/Export permits required.

$C_{31}H_{41}NO_4$

Molecular weight - 491.65

HCL - Percentage of anhydrous base - 93.1



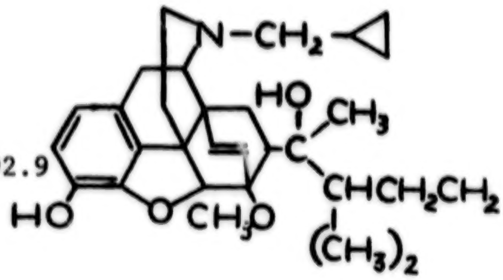
90. M-320

N-cyclopropylmethyl-6, 14-endoetheno-7 (2-hydroxy-5-methyl-2-hexyl) tetrahydronoripavine; a thebaine derivative; Schedule I; No CSA Code assigned; Import/Export permits required.

$C_{30}H_{41}NO_4$

Molecular weight - 479.64

HCL - Percentage of anhydrous base - 92.9

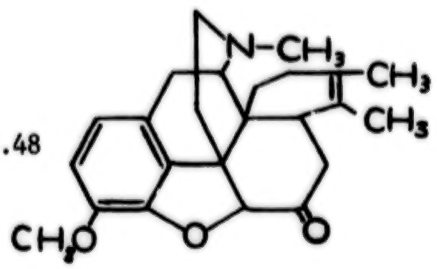


91. M-336

7,8-dihydro-5'6'-dimethylcyclohex-5'-endo [1', 2': 8, 14] codeinone; CL-108, 476, a thebaine derivative; Schedule I; No CSA Code assigned; Import/Export permits required.

$C_{24}H_{29}NO_3$

Molecular weight - 379.48

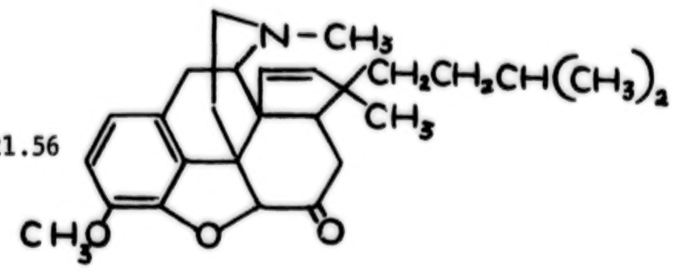


92. M-339

7,8,-dihydro-6'-iso-amyl-5'methyl-cyclopent-5'-eno [1',2':8,14]codeinone; a thebaine derivative; Schedule I; No CSA Code assigned; Import/Export permits required.

$C_{27}H_{35}NO_3$

Molecular weight - 421.56

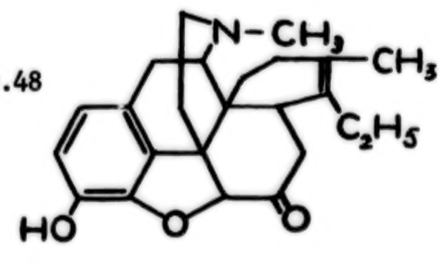


93. M-355

7,8-dihydro-6'-ethyl-5-methylcyclohex 5'-eno [1'2':8,14] morphinone; a thebaine derivative; Schedule I; No CSA Code assigned; Import/Export permits.

$C_{24}H_{29}NO_3$

Molecular weight - 379.48

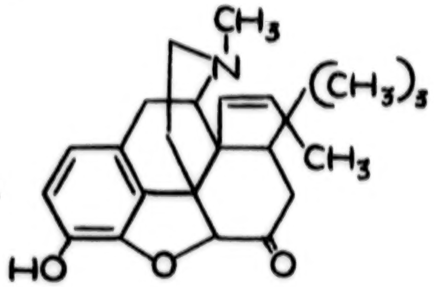


94. M-356

7,8-dihydro-5'-methyl-5'propylcyclopent-3'-eno [1',2':8,14]morphinone; **a thebaine derivative**; Schedule I; No CSA code assigned; Import/Export **permits required.**

$C_{25}H_{31}NO_3$

Molecular weight - 393.51

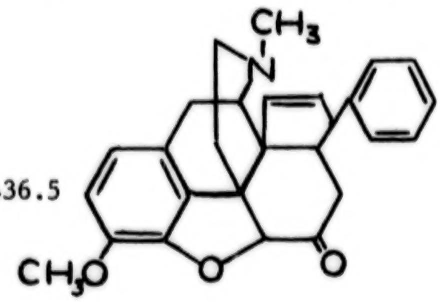


95. M-358 (a)

7,8-dihydro-5', methyl-5'-phenyl cyclopent-3-enol [1'2':8,14]codeinone; a thebaine derivative; Schedule I; No CSA Code assigned; Import/Export permits required.

$C_{28}H_{29}NO3 \cdot \frac{1}{2}H_2O$

Molecular weight - 436.5

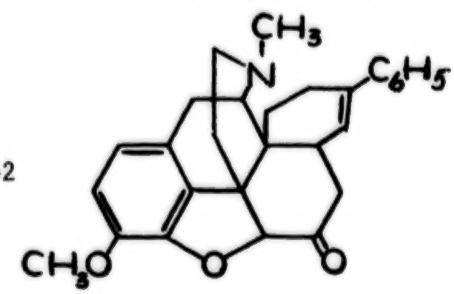


96. M-358

7,8,dihydro-5'-phenylcyclohex-4'-eno' [1',2':8,14] codeinone; a thebaine derivative; Schedule I; No CSA Code assigned; Import/Export permits required.

$C_{28}H_{29}NO_3$

Molecular weight - 427.52

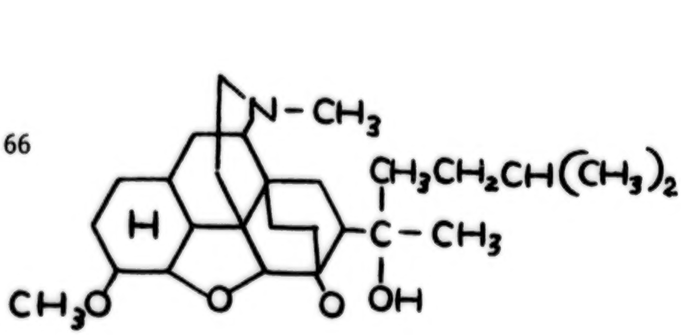


97. M-369

6,14-endetheno-7-(2-hydroxy-5-methyl-2-hexyl) decahydrothebaine; Schedule I; NO CSA code assigned; Import/Export permits required.

$C_{28}H_{47}NO_4$

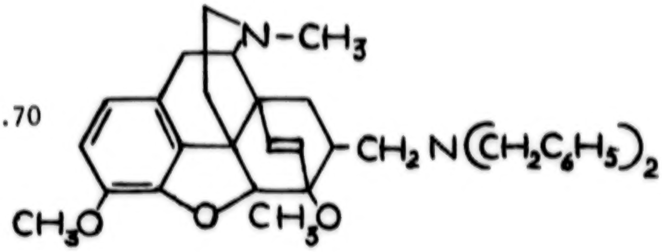
Molecular weight - 461.66



98. M-4125
7-dibenzylaminomethyl-6, 14-endo-etheno-tetrahydrothebaine; a thebaine derivative; Schedule I; No CSA Code assigned; Import/Export permits required.

$C_{36}H_{40}N_2O_3$

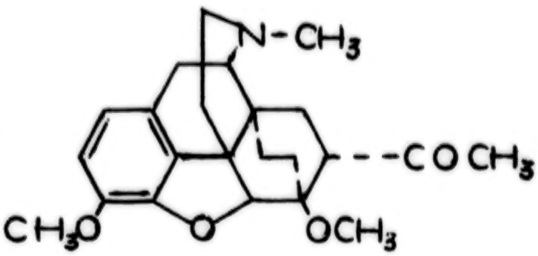
Molecular weight - 548.70



99. M-5028
7, alpha-acetyl 6,7,8,14-tetrahydro 6, 14-endoetheno thebaine. Derived from M-39, a thebaine derivative; Schedule I; CSA Code #-9059; Import/Export permits required.

$C_{23}H_{27}NO_4$

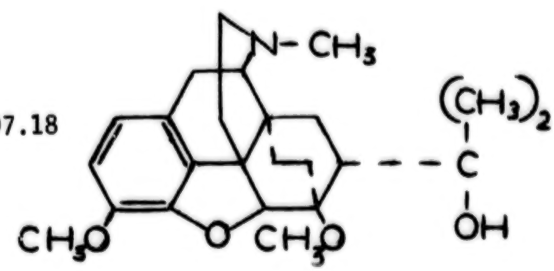
Molecular weight - 381.46



100. M-5039
N-cyno-7-alpha-(1-hydroxy-1-methyl-ethyl)-6,7,8,14-tetrahydro-6, 14-endo-ethanonorthebaine; a thebaine derivative; No CSA Code assigned; Import/Export permits required.

$C_{22}H_{21}N_2O_4$

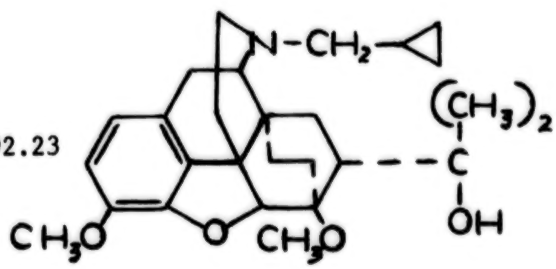
Molecular weight -407.18



101. M-5046
N-cyclopropylmethyl-7-alpha-(1-hydroxy-1-methylethyl)-6,7,8,14-tetrahydro-6, 14-endo ethenonorthebaine; Schedule I; No CSA code assigned; Import/Export permits required.

$C_{27}H_{36}NO_4$

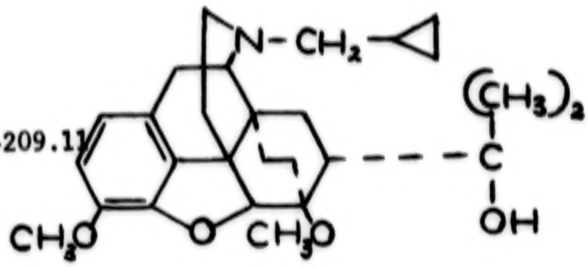
Molecular weight -492.23



102. M-5050 (DIPRENORPHINE)
N-cyclopropylmethyl-7 alpha-(1-hydroxy-1-methylethyl-6,7,8,14-tetrahydro-6, 14-endo ethenonororipavine; a thebaine derivative; Schedule II; CSA Code #-9058; Import/Export permits required.

$C_{25}H_{29}NO_4$

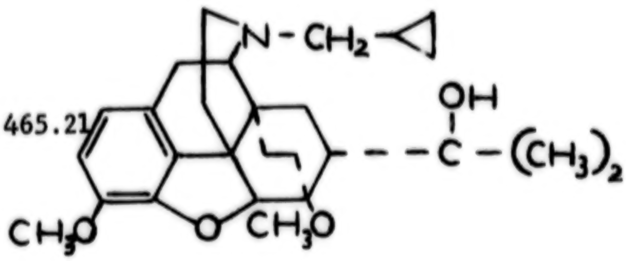
Molecular weight -209.11



103. M-5056
N-cyclopropylmethyl-7-alpha-(1-hydroxy-1-methylethyl)-6,8,8,14-tetrahydro-6, 14-endo-ethenonorthebaine; a thebaine derivative; Schedule I; No CSA Code assigned; Import/Export permits required.

$C_{25}H_{29}NO_4$

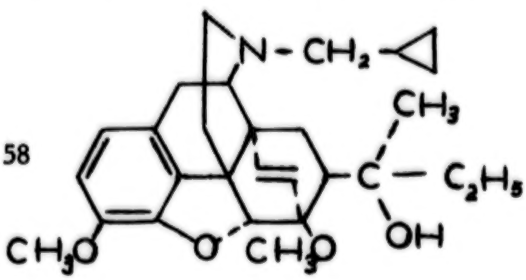
Molecular weight -465.21



104. M-5205
N-cyclopropylmethyl-7-alpha /1-(R)-hydroxy-1-methylpropyl/-6,7,8,14-tetrahydro-6,14-endoethenonorthebaine; a thebaine derivative; Schedule I; No CSA Code Assigned; Import/Export permits required.

$C_{28}H_{37}NO_4$

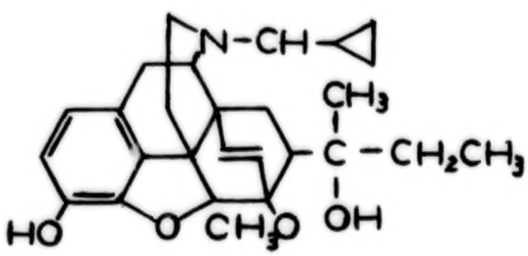
Molecular weight - 451.58



105. M-5217
N-cyclopropylmethyl-6,14-endo etheno-7-(2-hydroxy-2-butyl)-tetrahydro-nororipavine; a thebaine derivative; No CSA Code assigned; Import/Export permits required.

$C_{27}H_{35}NO_4$

Molecular weight - 437.56

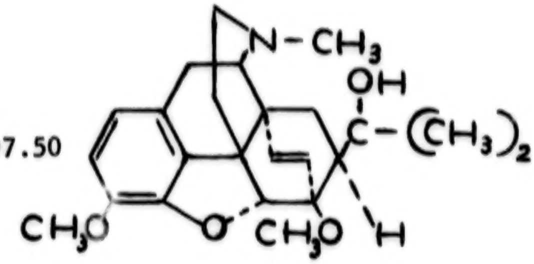


106. M-5628

An M-50 emiper; 6, 14-endo-etheno-7, beta-(2-hydroxy-2-propyl) tetrahydrothebaine; Schedule I; No CSA Code assigned.

$C_{24}H_{31}NO_4$

Molecular weight - 397.50

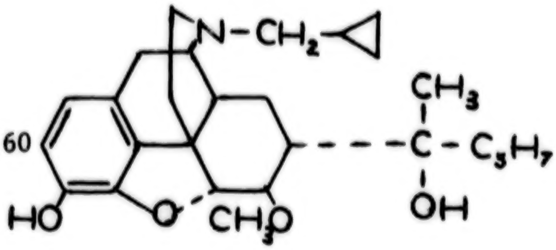


107. M-6007

N-cyclopropylmethyl-7-alpha-(1-hydroxy-1-methylbutyl)-6,7,8,14-tetrahydro-6, 14-endo-ethenonororipavine; a thebaine derivative; Schedule I; No CSA Code assigned; Import/Export permits required.

$C_{28}H_{39}NO_4$

Molecular weight - 453.60

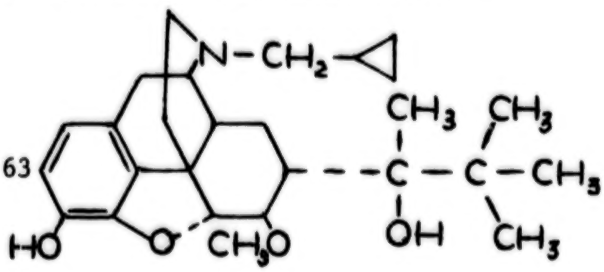


108. M-6029

N-cyclopropylmethyl-7, alpha (1-hydroxy-1,2,2-trimethylpropyl)-6,7,8, 14-tetrahydro-6,14-endo-ethenonororipavine; a thebaine derivative; Schedule I; No CSA Code assigned; Import/Export permits required.

$C_{29}H_{41}NO_4$

Molecular weight - 467.63

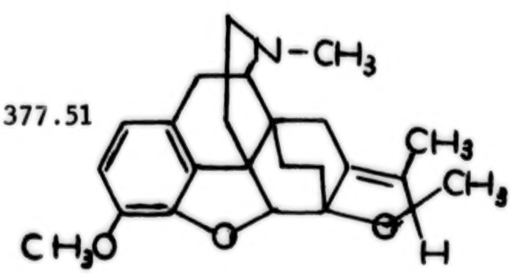


109. M-6623

7,8-dihydro-1',5'-dimethyl-6,14-endo-ethenocyclopenteno (3',2':6,7) codide; a thebaine derivative; No CSA Code assigned; Import/Export permits required.

$C_{15}H_{31}NO_2$

Molecular weight - 377.51

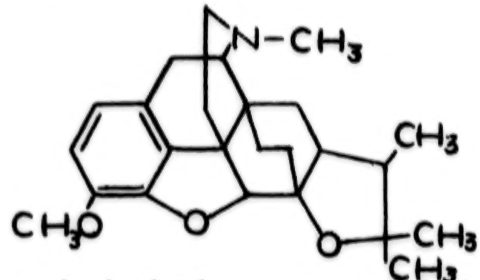


110. M-6622

2',3',4',5',7,8-hexahydro-4',5',5',-trimethyl-6, 14 endo-ethanofuraho (2',3':6,7)-codide; Schedule I; No CSA Code assigned; Import/Export permits required.

$C_{25}H_{33}NO_3$

Molecular weight - 395.53

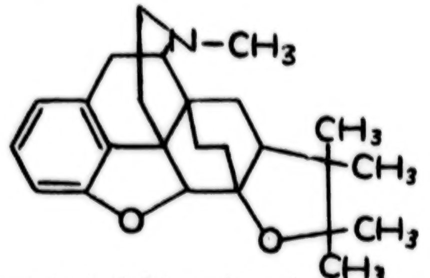


111. M-6624

2',3',4',5',7,8-hexahydro-4',4',5',5',-tetramethyl-6,14-endo-ethenofurano (2'3':6,7) codide; Schedule I; No CSA Code assigned; Import/Export permits required.

$C_{26}H_{35}NO_3$

Molecular weight - 409.35

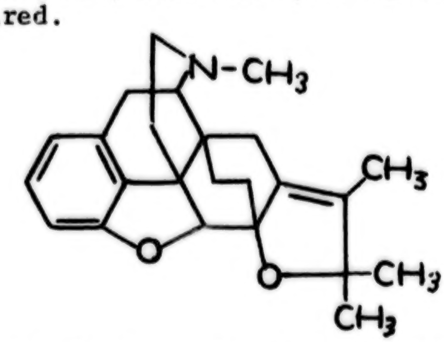


112. M-6625

7,8-dihydro-1',5',5',-trimethyl-6,14-endo ethenocyclopenteno (3',2': 6,7) codide; a thebaine derivative; Schedule I; No CSA Code assigned; Import/Export permits required.

$C_{26}H_{33}NO_2$

Molecular weight - 391.54



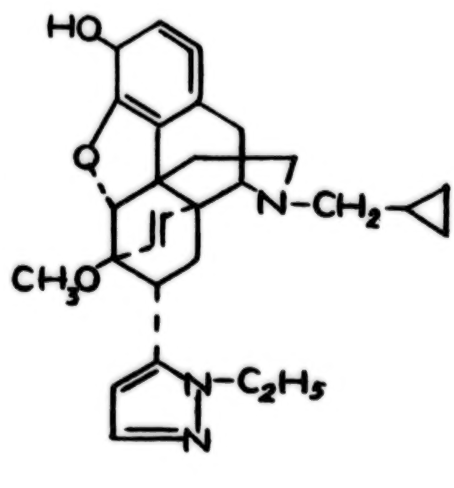
113. M-6050

N-cyclopropylmethyl-7 alpha-(1-phenyl-5-pyrazolyl)-6,7,8,14-tetrahydro-6, 14-endo ethenonoripavine; a thebaine derivative; Schedule I; no CSA Code assigned; Import/Export permits required.

$C_{32}H_{33}N_3O_3$

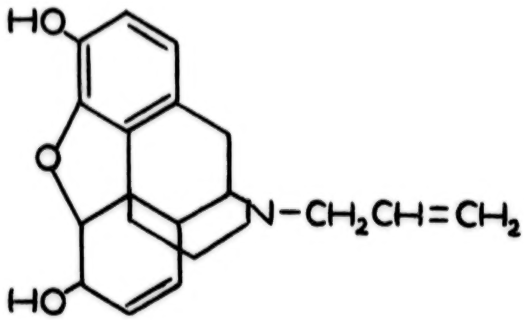
Molecular weight - 507.61

Citrate - Percentage of anhydrous base - 72.6



1. NALORPHINE-(N-ALLYLNORMORPHINE)
Allorphine, Antorphine; Lehridrome; Nalline-Merck; Schedule III; CSA Code #-9406; Import/Export permits required. A morphine derivative, possessing slight analgesic activity; however, used as an antagonist in morphine or heroin poisoning. Not subject to international controls.

$C_{19}H_{21}NO_3$



Molecular weight - 311.37

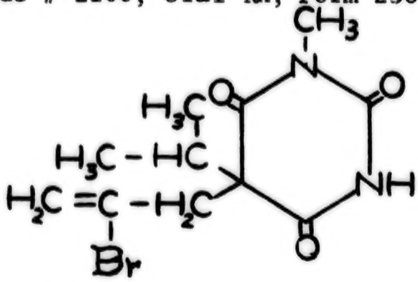
HCL Salt - $C_{19}H_{21}NO_3 \cdot HCL$
Percentage of anhydrous base - 89.52

HBR Salt - $C_{19}H_{21}NO_3 \cdot HBR$
Percentage of anhydrous base - 79.59

2. NARCOBARBITAL
1-methyl-5-(2-bromoallyl)-5-isopropylbarbituric acid; Enarcon; Narcodorm; Pronarcon; Schedule III; CSA Code #-2100; oral Rx; Form 236.

$C_{11}H_{15}N_2O_3Br$

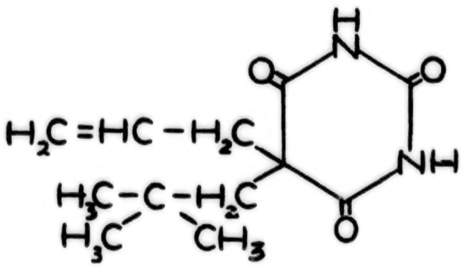
Molecular weight - 324.98



3. NEALBARBITAL
5-allyl-5-neopentylbarbituric acid; Censedal; Nevental; Schedule III; Import/Export permits required; CSA Code #-2100; oral Rx.

$C_{12}H_{18}N_2O_3$

Molecular weight - 259.09

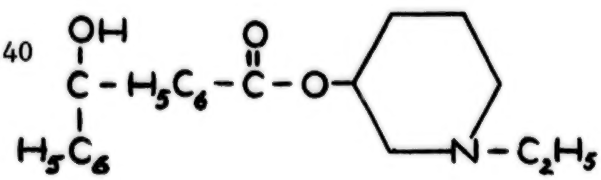


N

4. N-ETHYL-3-PIPERIDYL BENZILATE
JB-318; Schedule I; CSA Code #-7482; Import/Export permits required.

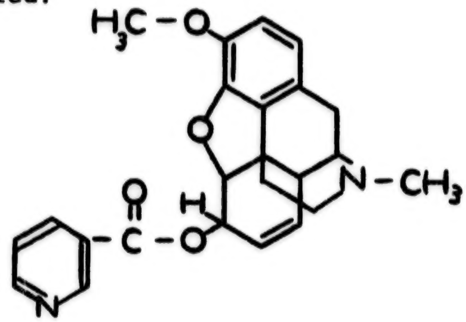
$C_{21}H_{20}O_3N$

Molecular weight - 334.40



5. **NICOCODEINE**

Codeine nicotinic acid ester; 6-nicotinylcodeine; Schedule I; CSA Code #-9309; Import/Export permits required.

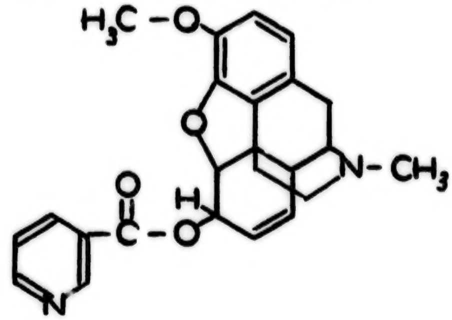


$C_{24}H_{24}N_2O_4$

Molecular weight - 404.47

6. NICODICODEINE*

6-nicotinyldihydrocodeine; N.I.H -8238; dihydrocodeine nicotinic acid; Schedule I; CSA Code #-9103; Import/Export permits required.

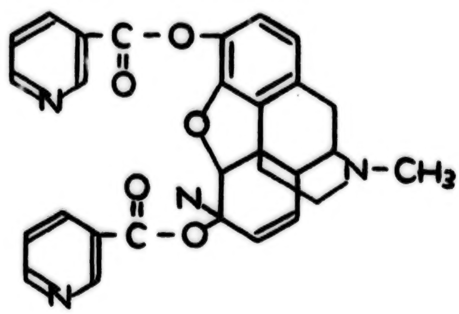


$C_{24}H_{26}N_2O_4$

Molecular weight - 406.46

7. **NICOMORPHINE**

Nocophine; Vilan; Schedule I; CSA Code #-9312; Import/Export permits required.

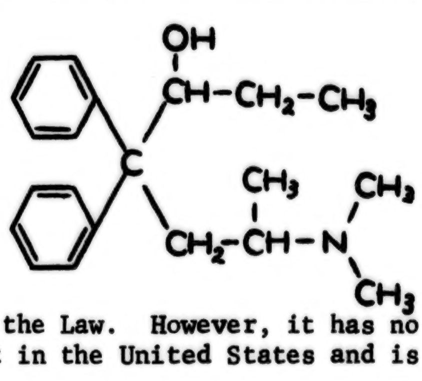


$C_{29}H_{25}N_3O_5$

Molecular weight - 495.51

8. N.I.H.-2933

Amidol, Dimepheptanol; Methadol; N.I.H -2933; 4,4-diphenyl-6-dimethyl amino heptanol-3; 6-dimethylamino-4, 4-diphenyl-3-heptanol; a methadone derivative; Schedule I; CSA Code #-9618; Import/Export permits required.



$C_{21}H_{29}NO$

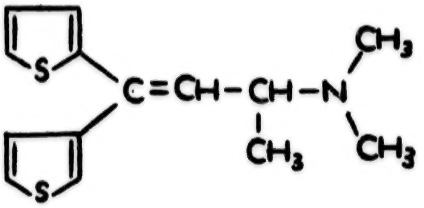
Molecular weight - 311.45

HCL - Percentage of anhydrous base - 89.52

*Corrigendum-Not listed in any schedule of the Law. However, it has no currently accepted medical use in treatment in the United States and is controlled under the Single Convention.

9. NIH-4542

Dimethylthiambutene; aminobutene; dimethibutin; 3-dimethylamino-1, 1-di-(2-thienyl)-1-butene; Schedule I; CSA Code #-9619; Import/Export permits required.

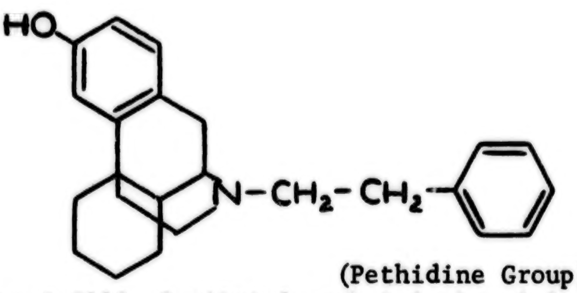


$C_{14}H_{17}NS_2$

Molecular weight - 236.21

10. NIH-7274

Phenomorphan; 3-hydroxy-n-phenethyl-morphinan; its racemic and levorotatory forms (but excepting its dextroratatory form); Schedule I; CSA Code #-9647; Import/Export permits required.

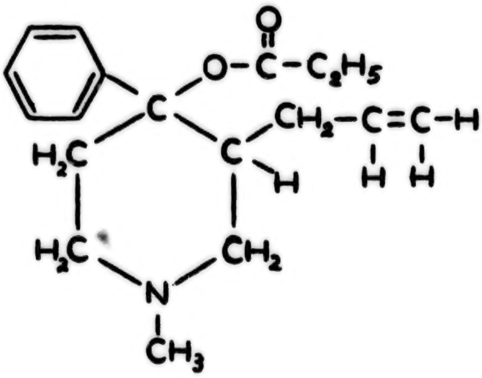


$C_{24}H_{29}NO$

Molecular weight - 347.41

11. NIH-7440 (Pethidine Group)

Allylprodine; Alperidine; Ro-2-7113; 3-allyl-1-methyl-4-phenyl-4-propinoxypiperidine; Schedule I; CSA Code #-9602; Import/Export permits required.



$C_{18}H_{25}NO_2$

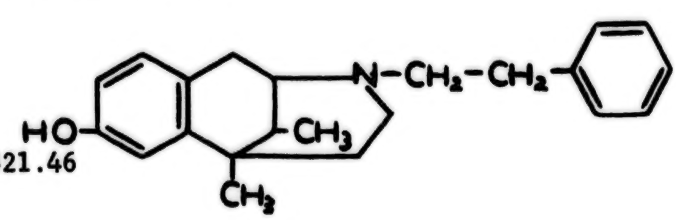
Molecular weight - 287.41

HCL Salt - $C_{18}H_{25}NO_2 \cdot HCL$

Percentage of anhydrous base - 88.70

12. NIH-7519

Phenazocine; Prinadol, (S.K.F.); SKF-6574; 2'hydroxy-5, 9-dimethyl-2-(2-phenethyl)-6-7-benzomorphan; Schedule II; written Rx; CSA Code #-9715; Import/Export permits required.



$C_{22}H_{27}NO$

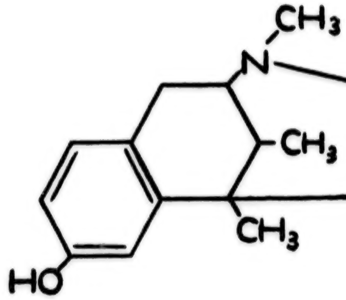
Molecular weight - 321.46

13. **NIH-7539**

Metazocine, methobenzorphan; 2'-hydroxy-2,5,9-trimethyl [6,7-**benzomorphan**] **Schedule** I; CSA Code #-9240; Import/Export permits **required**.

$C_{15}H_{21}NO$

Molecular weight - 231.34



14. NIH-7574

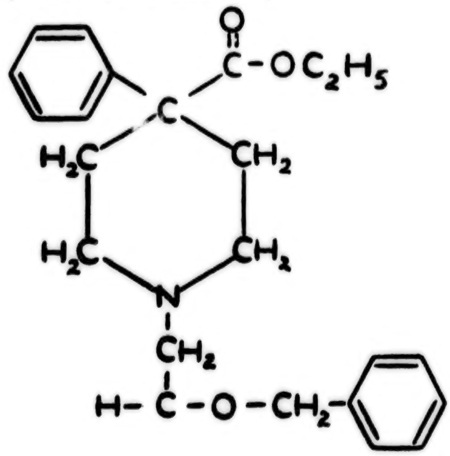
Benzethidine; Ethyl 1-(2-benzyloxyethyl)-4-phenyl-4-piperidine carboxylate; HO-9585; a pethidine derivative; CSA Code #-9606; Import/Export permits required.

$C_{23}H_{29}NO_2$

Molecular weight - 367.40

HBN - Percentage of anhydrous base - 82.14

HCL- Percentage of anhydrous base - 90.94



15. NIH-7590

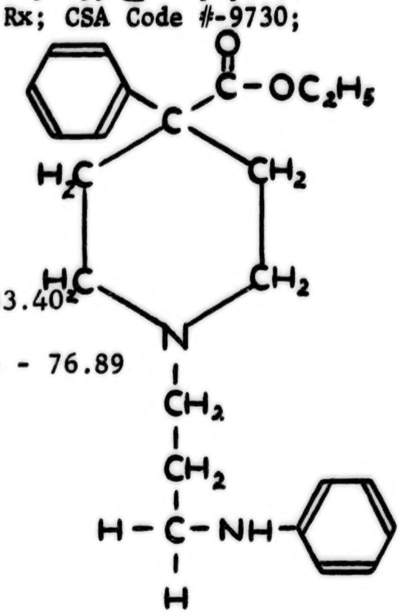
Alvodine; ethyl-4-phenyl-1-[3-(phenylaminol-propyl]-4-piperidine-carboxylate; WIN-14098; Schedule II; written Rx; CSA Code #-9730; Import/Export permits required.

$C_{23}H_{30}N_2O_2$

Molecular weight - 366.51

Dichloride - Percentage of anhydrous base - 83.40

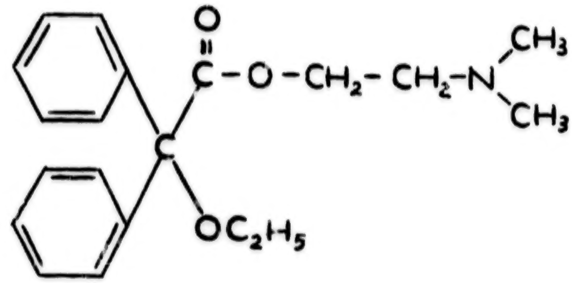
Ethansulfonate - Percentage of anhydrous base - 76.89



16. NIH-7577
Dimenoxadol; Lokarin; dimethyl aminoethyl-1-ethoxy-1, diphenyl-acetate; Schedule I; CSA Code #-9617; Import/Export permits required.

$C_{20}H_{25}NO_3$

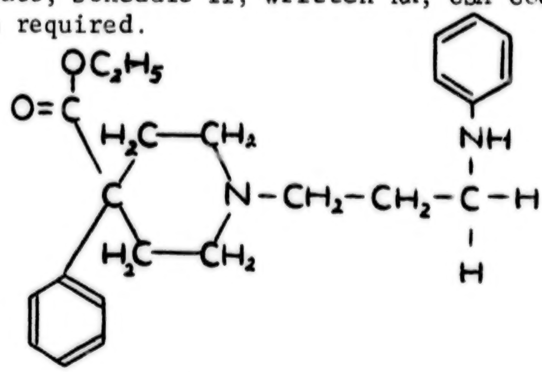
Molecular weight - 327.43



17. NIH-7590
Piminodine; Alvodine(Win); ethyl 1, 4-phenyl-1-[3-(phenylaminol-propyl]]-4-piperidinecarboxylate; Schedule II; written Rx; CSA Code #-9730; Import/Export permits required.

$C_{23}H_{30}N_2O_2$

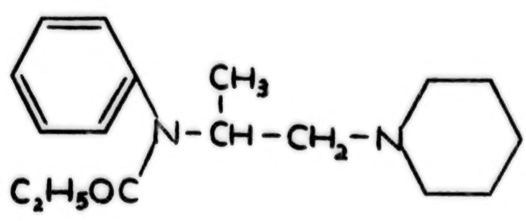
Molecular weight - 366.51



18. NIH-7602
Phenampromide; N-(1-methyl-2-piperidinoethyl)-propionamilide; Schedule I; CSA Code #-9638; Import/Export permits required.

$C_{17}H_{26}N_2O$

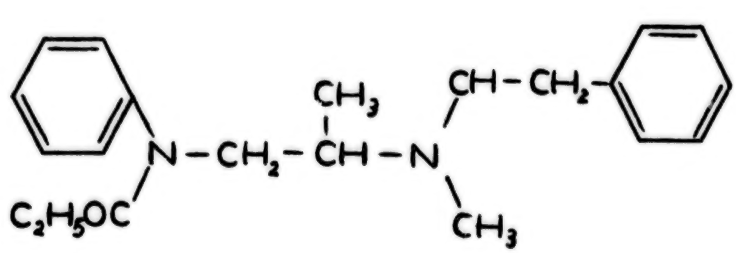
Molecular weight - 274.41



19. NIH-7603
Diampromide; N-(2-[(methyl)-phenethylamino]-propyl)propioanilide; CL-22,119, American Cyanamid; Schedule I; CSA Code #-9615; Import/Export permits required.

$C_{21}H_{28}N_2O$

Molecular weight - 324.45



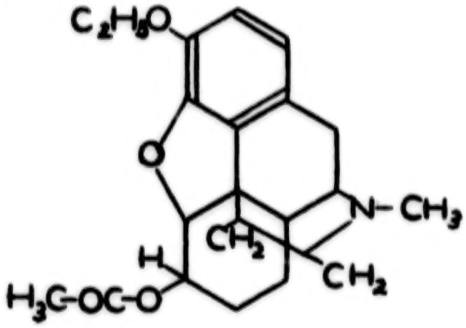
306-877 O - 79 - 14

20. NIH-7623

6-acetyl-3-ethoxydihydromorphine; Schedule I; No CSA Code assigned; Import/Export permits required.

$C_{21}H_{29}O_4N$

Molecular weight - 358.96

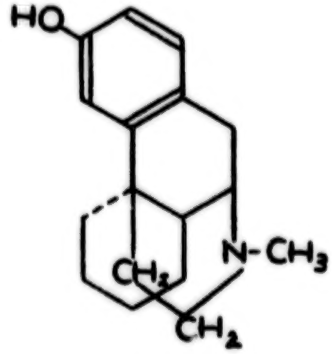


21. NIH-7657

(-)3-Hydroxy-N-methylisomorphinan CL-22,407; M Gates; Schedule I; No CSA Code assigned; Import/Export permits required.

$C_{17}H_{19}NO$

Molecular weight - 252.33

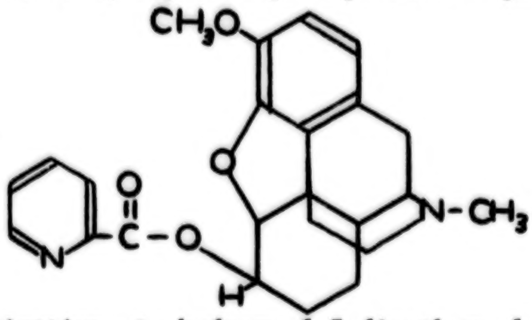


22. NIH-8238

Nicodicodeine; 6-nicotinyl-dihydrocodeine; dihydrocodeine nicotinic acid; Schedule I; CSA Code #-9103; Import/Export permits required.

$C_{24}H_{26}N_2O_4$

Molecular weight - 406.46

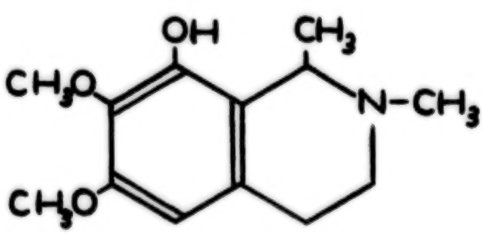


23. N-METHYLANHALONIDINE

Pellotine; a peyote derivative; 8 -hydroxy-6,7-dimethoxy-1, 2-dimethyl-1,2,3,4-tetrahydroisoquinoline; Schedule I; CSA Code #-7418; Import/Export permits required.

$C_{13}H_{19}NO_3$

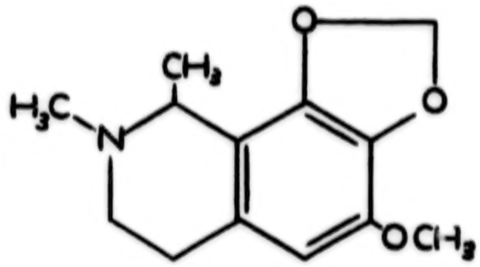
Molecular weight - 237.29



24. N-METHYLANHALONINE
Lophophorine; a peyote derivative; Schedule I; CSA Code #-7420; Import/Export permits required.

$C_{13}H_{17}NO_3$

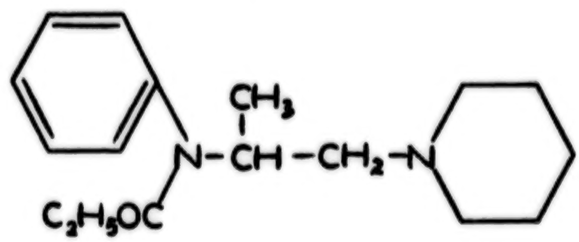
Molecular weight - 235.29



25. N-(1-METHYL-2-PIPERIDINOETHYL)-PROPIONANILIDE
Phenampromide; Schedule I; CSA Code #-9638; Import/Export permits required.

$C_{17}H_{26}N_2O$

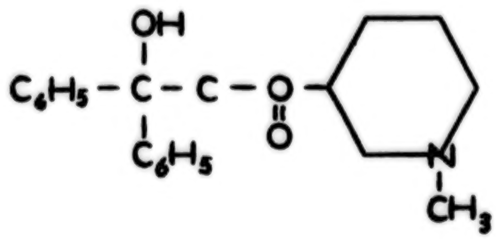
Molecular weight - 274.41



26. N- METHYL-3-PIPERIDYL BENZILATE
JB-336; Schedule I; CSA Code #-7484; Import/Export permits required.

$C_{20}H_{18}O_3N$

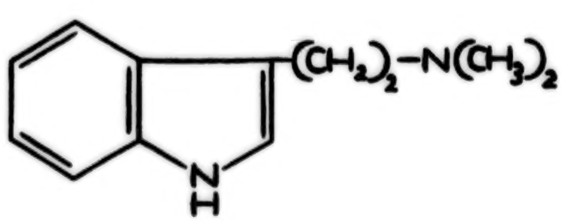
Molecular weight - 320.71



27. N, N-DIMETHYLTRYPTAMINE
Dimethyltryptamine; DMT; 2[2-(dimethylamino)ethyl] indole; Schedule I; CSA Code #-7435; Import/Export permits required.

$C_{12}H_{16}N_2$

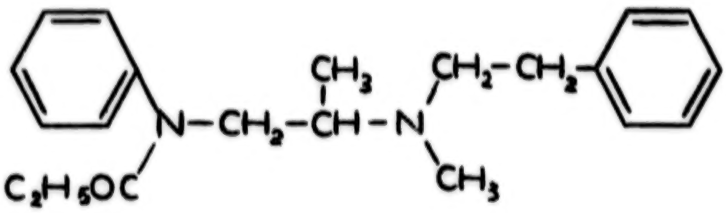
Molecular weight - 188.26



28. N-[2(N-METHYLPHENETHYL-AMINO)-PROPYL]-PROPIONANILIDE
Diampromide; Schedule I; CSA Code #-9615; Import/Export permits required.

$C_{21}H_{28}N_2O$

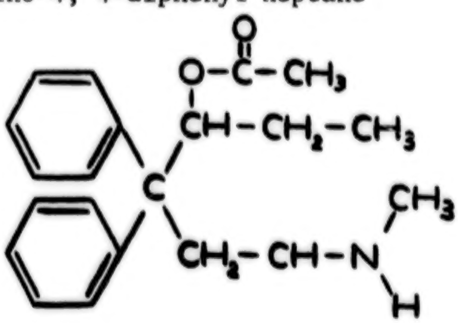
Molecular weight - 324.47



29. NORACYMETHADOL
Alpha-dl-3-acetoxy-6-methyl-amino-4, 4-diphenyl heptane

$C_{22}H_{29}NO_2$

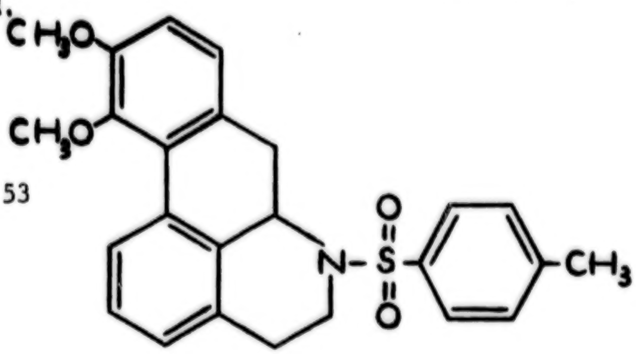
Molecular weight - 339.48



30. NORAPOMORPHINE DIMETHYL ETHER P-TOLUENESULFONAMIDE
A codeine **derivative; Schedule** I; No CSA Code assigned; Import/Export **permits required.**

$C_{25}H_{25}NO_4S$

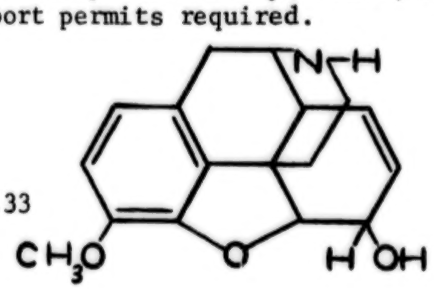
Molecular weight - 435.53



31. NORCODEINE*
N-Desmethylcodeine; normorphine-3-methyl ether; Schedule I; CSA Code #-9104; Import/Export permits required.

$C_{17}H_{19}NO_3$

Molecular weight - 285.33

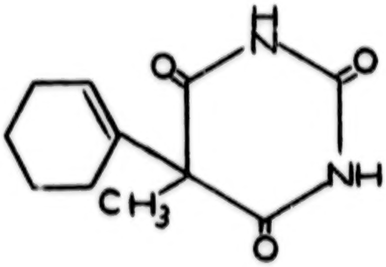


*Corrigendum-Not listed in any schedule of the Law. However, it has no currently accepted medical use in treatment in the United States and is controlled under the Single Convention.

32. NORHEXOBARBITAL
5-cyclohexen-1-yl-5-methyl barbituric acid; Schedule III; oral Rx; CSA Code #-2100; Form 236.

$C_{11}H_{14}N_2O_3$

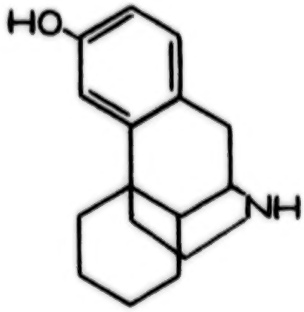
Molecular weight - 228.09



33. NORLEVORPHANOL
NIH-7539; Ro-1-7686; 1-3-hydroxynormorphinan; Schedule I; CSA Code #-9634; Import/Export permits required.

$C_{16}H_{21}NO$

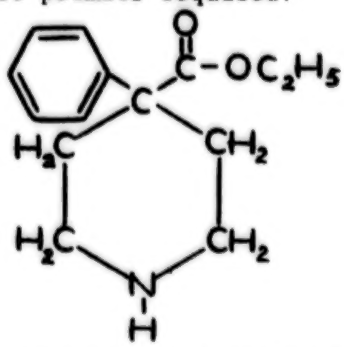
Molecular weight - 243.35



34. NORMEPERIDINE
Norpethidine; pethidine intermediate-B; a pethidine precursor; ethyl-4-phenylpiperidine-4-carboxylate; also a precursor to diphenoxylate; Schedule II; CSA Code #-9233; Import/Export permits required.

$C_{14}H_{19}NO_2$

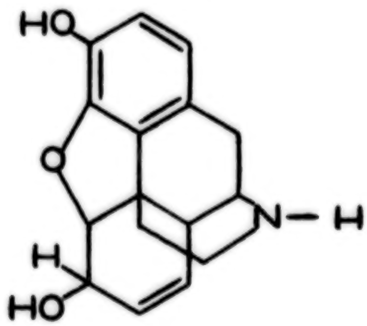
Molecular weight - 233.30



35. NORMORPHINE
N-Demethylated morphine; Schedule I; CSA Code #-9313; Import/Export permits required.

$C_{16}H_{17}NO_3$

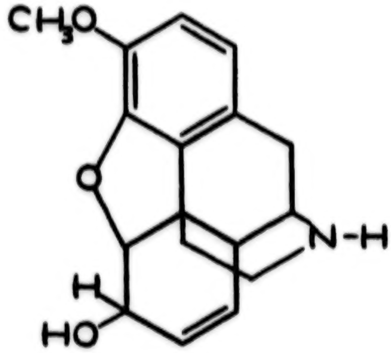
Molecular weight - 271.32



36. NORMORPHINE-3-METHYL ESTER
Norcodeine; N-Desmethylcodeine; Schedule I; CSA Code #-9104; Import/Export permits required.

$C_{17}H_{19}NO_3$

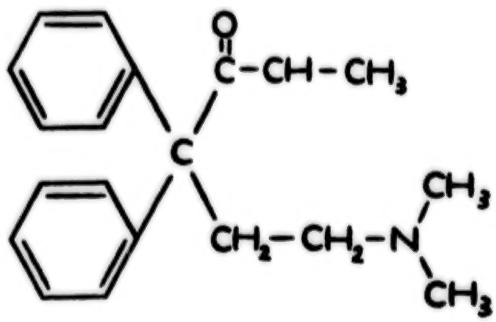
Molecular weight - 285.33



37. NORMETHADONE
Deatussan; Mepidon; Normedon; Phenyl-dimazone; Ticarda; Veryl; 4,4-diphenyl-6-dimethylamino-3-hexanone; Schedule I; CSA Code #-9635; Import/Export permits required.

$C_{20}H_{25}NO$

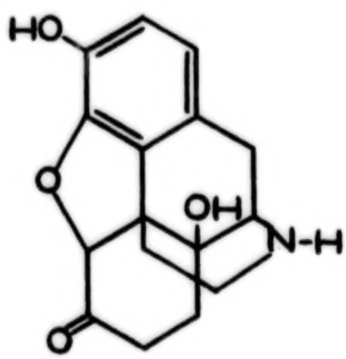
Molecular weight - 295.40



38. NOROXYMORPHONE
Schedule I; No CSA Code assigned; Import/Export permits required.

$C_{16}H_{18}O_4N$

Molecular weight -

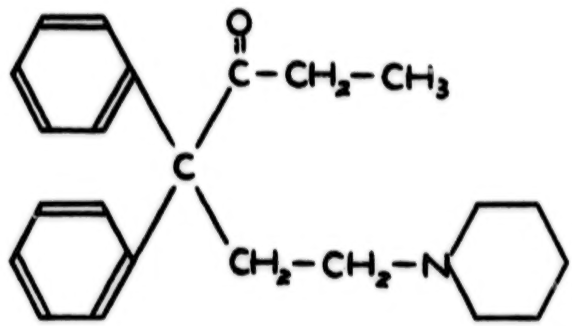


39. NORPIPANONE

Hexalgon; 4,4-diphenyl-6-piperidino-3-hexanone; Schedule I; CSA Code #-9636; Import/Export permits required.

$C_{23}H_{29}NO$

Molecular weight - 335.47

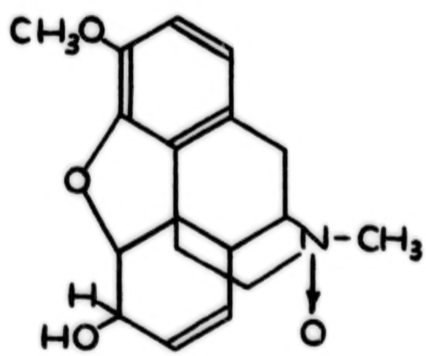


40. N-OXYCODEINE

Codeine-N-oxide; Genocodeine; Schedule I; CSA Code #-9053; Import/Export permits required.

$C_{18}H_{21}NO_4$

Molecular weight - 315.37

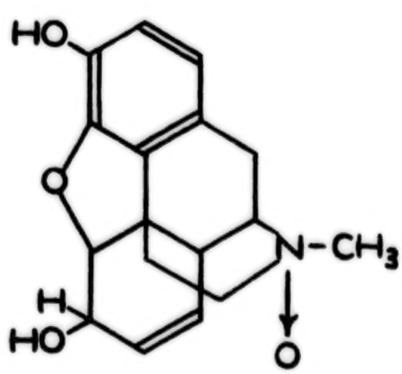


41. N-OXYMORPHINE

Morphine-N-oxide; genomorphine; Schedule I; CSA Code #-9307; Import/Export permits required.

$C_{17}H_{19}NO_4$

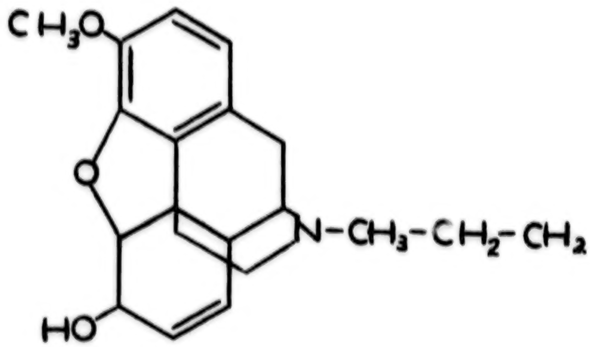
Molecular weight - 301.33



42. N-PROPYL NORCODEINE
Schedule I; No CSA Code assigned; Import/Export permits required.

$C_{20}H_{26}NO_3$

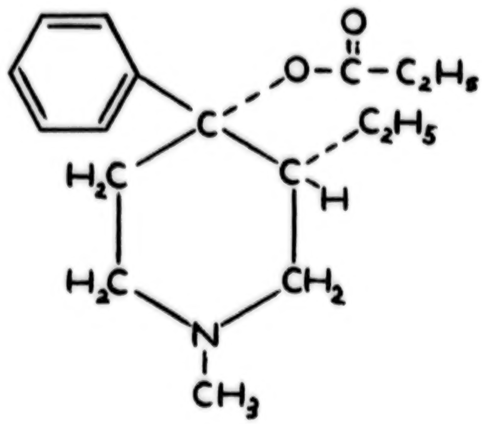
Molecular weight -



43. NU-1932
Alphameprodine and betameprodine; alpha-1-methyl-3-ethyl-4-phenyl-4-propionoxypiperidine; Schedule I; CSA Code #-9604; Import/Export permits required.

$C_{17}H_{25}NO_2$

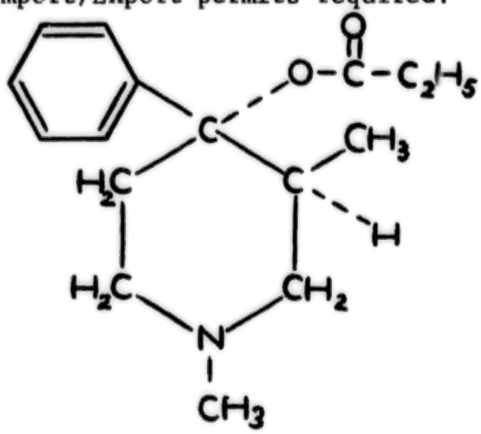
Molecular weight - 275.38



44. NU-1779
Betaprodine; beta-1,3-dimethyl-4-phenyl-4-propionoxypiperidine; Schedule I; CSA Code #-9611; Import/Export permits required.

$C_{16}H_{23}NO_2$

Molecular weight - 261.36



1. OPIUM

Raw opium; gum opium; Schedule II; CSA Code #-9600; Import/Export permits required.

raw opium	- 9600	Powdered opium	- 9639
extracts	- 9610	granulated opium	- 9640
fluid extracts	- 9620	tincture of opium	- 9630

As defined in Article I of the Single Convention of 1961, the term "opium" means "the coagulated juice of the opium poppy."

Opium is obtained from the unripe seed capsule of the poppy plant, Papaver somniferum, L.

Powdered opium contains over 35 alkaloids which constitute about 25% by weight of the opium. Morphine, codeine, thebaine, papaverine, noscapine and narceine are the most important. The remaining alkaloids occur only in trace quantities in combination with meconic acid.

Based on their chemical configuration, the opium alkaloids fall into two distinct classes; namely, the phenanthrene group and the benzylisoquinoline group. Alkaloids of the former group are highly addictive and under full control both nationally and internationally. Alkaloids of the latter group possess no addictive liabilities nor can they be readily converted to addictive substances. They are not subject to national or international controls.

The following is a list of alkaloids in each group:

I PHENANTHRENE	II BENZYLISOQUINOLINES	III OTHERS
Apocodeine	Codamine	The Corydalis
Apomorphine	Cotarnine	
Codeine	Cryptopine	
Codeinones	Gnoscopine	
Desoxycodeines	Hydrocotarmine	
Hydroxycodeinones	Lanthopine	
Methylmorphimethines	Laudanidine (1-Laudanine)	
Morphine	Laudanise	

I PHENANTHRENE	II BENZYLISOQUINOLINES
Morphinols	Laudanosine
Morphol	Meconidine
Morphothebaine	Narceine
Neopine	Noscapine (Narcotine)
Phenyldihydrothebaine	Oxynarcotine
Pseudomorphine	Papaveramine
Pseudothebaine	Papaverine
Thebaine	Protopine
Thebainone	Rhoeadine
Thiocodides	Tarconine
	Tritopine
	Zanthaline (papaveraldine)

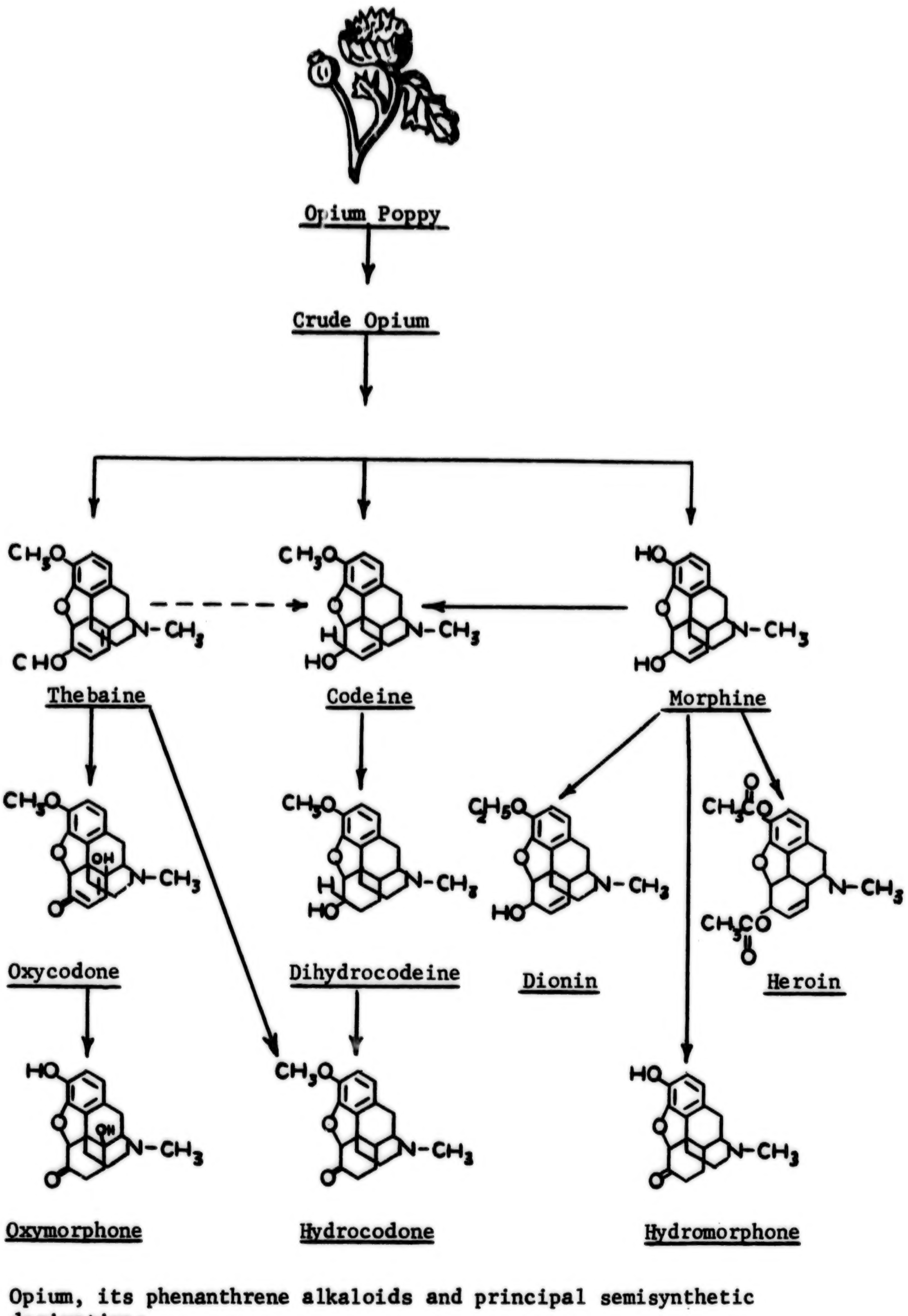
2. OPIUM

Paregoric; camphorated tincture of opium; Schedule III; oral Rx; CSA Code #-9809; Import/Export permits required. Not more than 500 milligrams of opium per 100 milliliters (2.28 grains per 29.573cc) or per 100 grams, or not more than 25 milligrams (.385 grains) per dosage unit, with one or more active non-narcotic ingredients in recognized therapeutic amounts.

U.S.P. paregoric yields not less than 35 milligrams and not more than 45 milligrams of anhydrous morphine (350 to 450 mgs. of opium) per 100cc. U.S.P. XVIII, page 474.

3. OPIUM

Preparations such as Donnagel-PG, (Robins); Parepectolin, ORorer); Schedule V; O.T.C.; CSA Code #-9631; Form 236. Not more than 100 milligrams of opium per 100 milliliters or per 100 grams (.46 grains per 29.573 cc).



Opium, its phenanthrene alkaloids and principal semisynthetic derivatives.

PLATE NO. V

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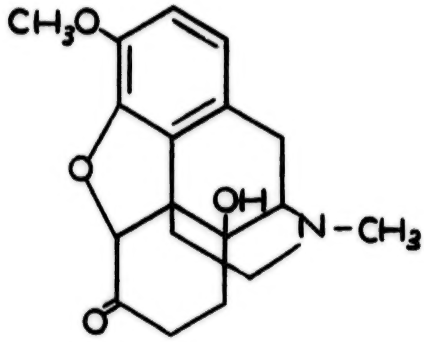
4. OXYCODONE

Dihydrohydroxycodeinone; 14-di-hydroxyhydroxycodeinone; prepared from thebaine; Schedule II; written Rx; CSA Code #-9142; Import/Export permits required. See Percodan, (Endo).

$C_{18}H_{21}NO_4$

Molecular weight - 315.36

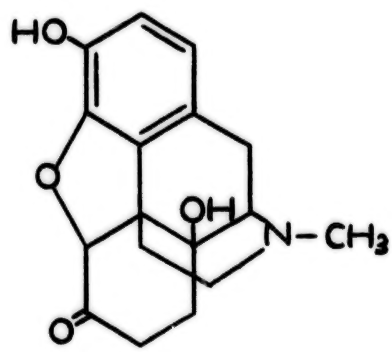


5. OXYMORPHONE

Dihydrohydroxymorphinone; Numorphan, (Endo); prepared from oxycodone; Schedule II; written Rx; CSA Code #-9652; Import/Export permits required.

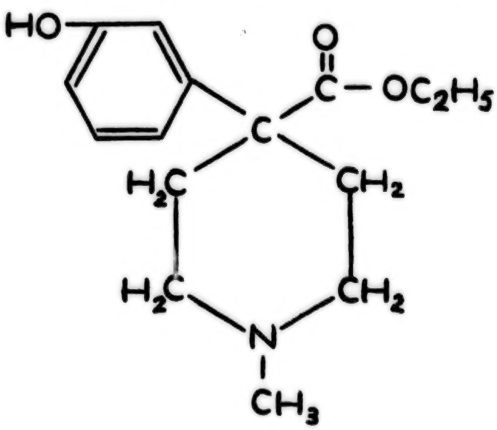
$C_{17}H_{19}NO_4$

Molecular weight - 301.33



6. OXYPETIDIN

Hydroxypethidine; Bemidone; 1-methyl-4- (3-hydroxyphenyl)-piperidine-4-carboxylic acid ethyl ester; Schedule I; CSA Code #-9627; Import/Export permits required.



$C_{15}H_{21}NO_3$

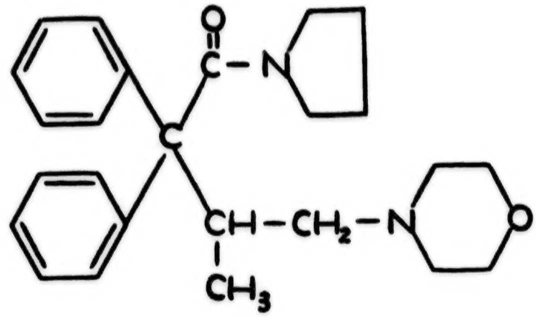
Molecular weight - 263.33

1. PALFIUM

Detromoramide; Jetrium; Pyrrolamidol; R-875; SKF-5137; d-3-methyl-2, 2-diphenyl-4-morpholino-butyrylpyrrolidine; Schedule I; CSA Code #-9613.

$C_{25}H_{32}N_2O_2$

Molecular weight - 392.55



2. PARAHEXYL

1-Hydroxy-3-n-hexyl-6,6,9-trimethyl-7,8,9,10-tetrahydro-6-dibenzopyran; Controlled under Psychotropic Convention of 1971. Not controlled under CSA.

$C_{16}H_{32}O$

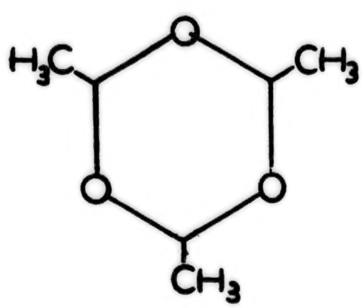
Molecular weight -

3. PARALDEHYDE

Paracetaldehyde; an acetyladehyde polymer; Schedule IV; CSA Code #-2585; Oral Rx; Form 236.

$C_6H_{12}O_3$

Molecular weight - 132.16

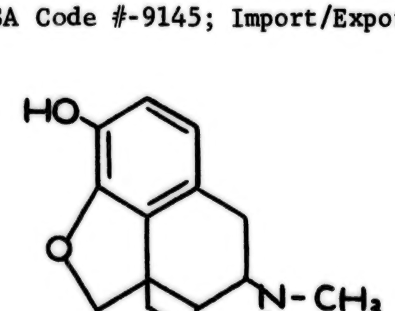


4. PARAMORFAN

Dihydromorphine; Schedule I; CSA Code #-9145; Import/Export permits required.

$C_{17}H_{21}NO_3$

Molecular weight - 287.35

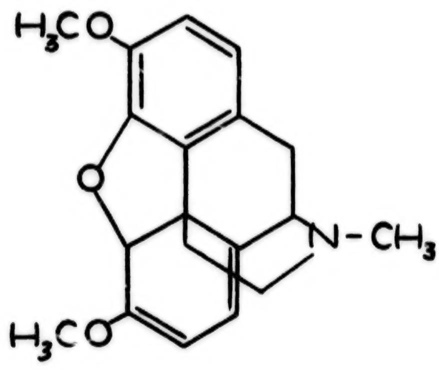


5. PARAMORPHINE

Thebaine; A principal phenanthrene alkaloid of opium. Usually found in ratios of .5 to 1.5%; 2,12-dimethoxy-N-methyl-1, 11-epoxymorphinene; Schedule II; CSA Code #-9333; Import/Export permits required.

$C_{19}H_{21}NO_3$

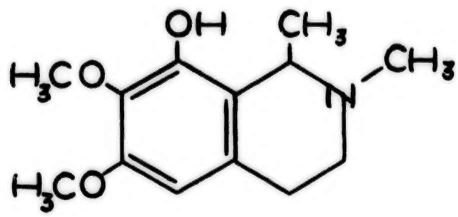
Molecular weight - 311.17



6. PELLOTINE

N-Methylanhalonidine; 8-hydroxy-6, 7-dimethoxy-1, 2-dimethyl-1,2,3,4-tetrahydroisoquinoline; Schedule I; CSA Code #-7418.

Molecular weight - 347.39



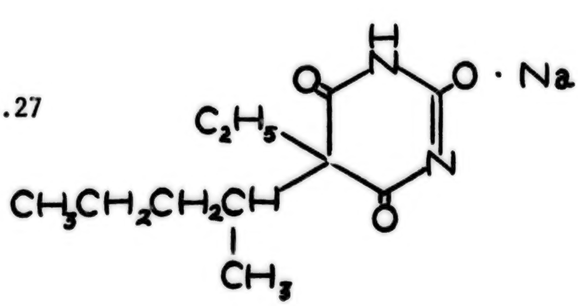
7. PENTOBARBITAL

5-ethyl-5-(1-methylbutyl) barbituric acid; Nembutal (Abbott); Schedule II; written Rx; CSA Code #-2270; Import/Export permits required.

$C_{11}H_{17}N_2O_3$

Molecular weight - 225.27

Na Salt - 90.73



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PETHIDINE AND ITS PRINCIPLE DERIVATIVES

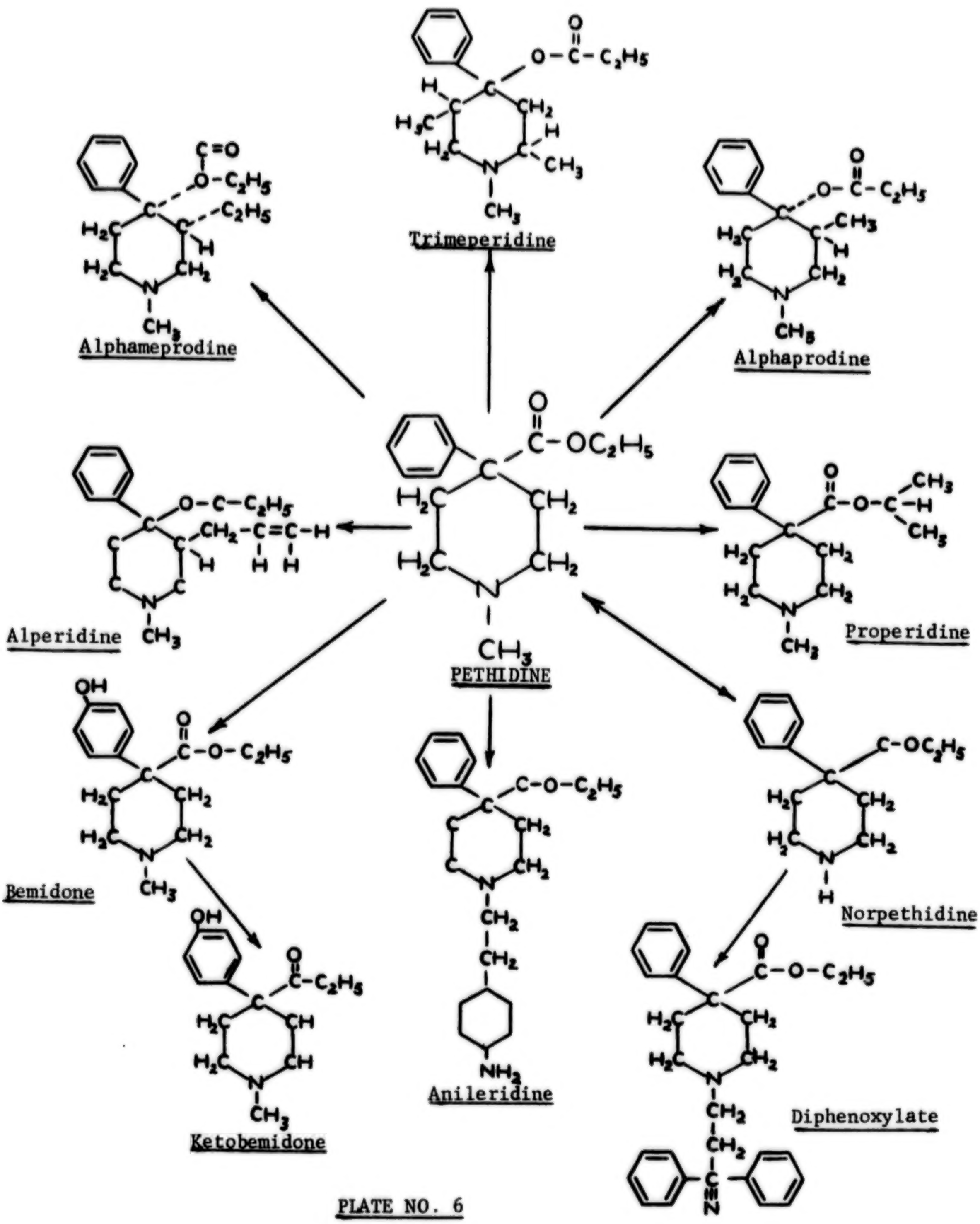


PLATE NO. 6

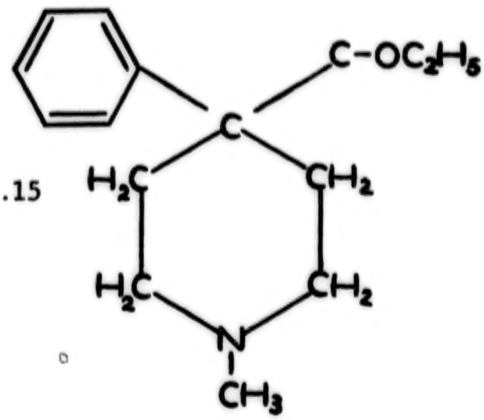
8. PETHIDINE

Isonipecotic acid isomer of nipecotic acid; isonipecaine, meperidine, Demerol (Win.); n-methyl-4-phenyl-4-carbethoxy-piperidine; the ethyl ester of 1-methyl-4-phenylisonipecotic acid; Schedule II; CSA Code #-9230; written Rx/ Import/Export permits required.

$C_{15}H_{21}NO_2$

Molecular weight - 247.32

HCL - Percentage of anhydrous base - 87.15

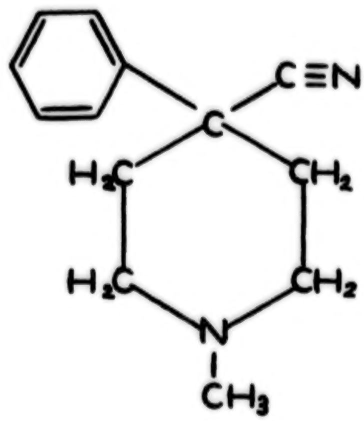


9. PETHIDINE-INTERMEDIATE-A

4-cyano-1-methyl-4-phenylpiperidine; Schedule II; CSA Code #-9232; Import/Export permits required.

$C_{13}H_{16}N_2$

Molecular weight - 200.29

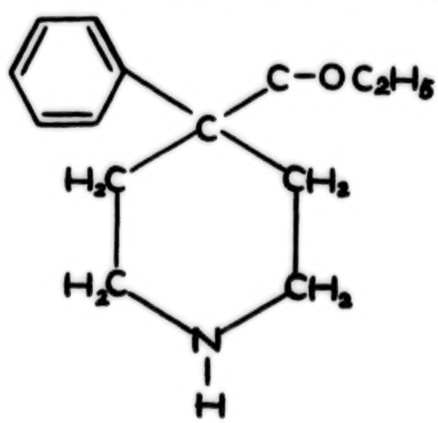


10. PETHIDINE-INTERMEDIATE-B

Norpethidine, normeperidine; ethyl-4-phenylpiperidine-4-carboxylate; precursor to diphenoxylate; CSA Code #-9233; Import/Export permits required.

$C_{14}H_{19}NO_2$

Molecular weight - 233.30

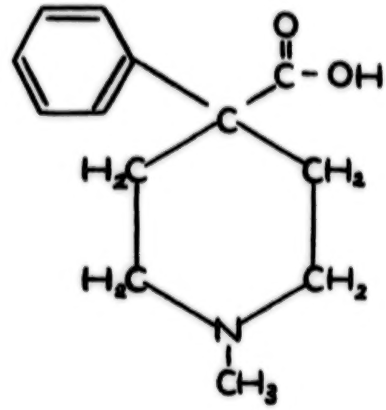


11. **PETHIDINE-INTERMEDIATE-C**

1-methyl-4-phenyl-4-piperidine-4-carboxylic acid; Schedule II; CSA Code #-9234; Import/Export permits required.

$C_{13}H_{17}NO_2$

Molecular weight - 214.29

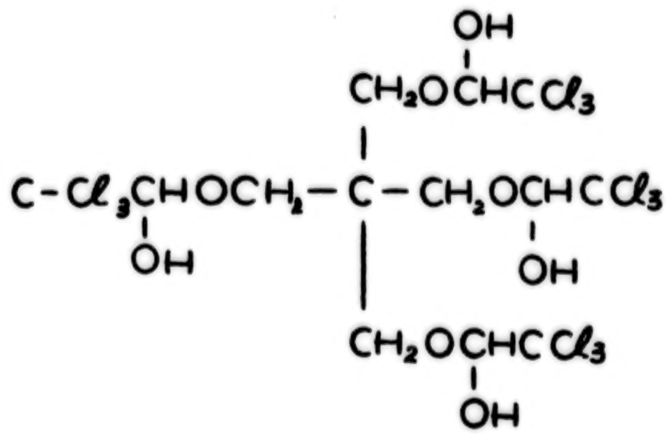


12. **PETRICHLORAL**

Petrichloral; Periclor; Pentaerythritol chloral; Schedule IV; oral Rx; CSA Code #-2591; Form 236.

$C_{13}H_{16}Cl_{12}O_8$

Molecular weight - 725.76



13. **PEYOTE**

Either of two spineless cacti, Lophophora williamsii or Lophophora lewinii. The tops are called mescal buttons and contain several alkaloids- including, but not limited to Anhalamine, Anhalonidine, Anhalonine, Lophophorine, Mescaline and Pellotine.

PEYOTE

Peyote is the dried top of a spineless cactus plant of the genus "Lophophora". Various generic names assigned to this plant led to the erroneous impression that a number of species existed. According to Coulter there is but one specie, Lophophora williamsii (Lemaire), but some variations existing in the arrangement of its tubercles led to the belief that two distinct varieties existed.

The plant is commonly called peyote, mescal buttons, pellote, peyotl, muscale or mexcal buttons, dumpling cactus and challote. It has been classified botanically at different times under the genus anhalonium, mommiliria, oriocarpus, echinocactus, (Spanish-cacalia) and lophophora. There has also been some controversy as to whether there are two distinct plants, williamsii and lewinii or whether, as Coulter contends, lewinii is merely a variation of the cactus williamsii and both can be found growing from the same root stock. American botanists recognize the genus Lophophora and consider the two, williamsii and lewinii to be the same plant. Peyote is cited in American literature as "Lophophora williamsii-lewinii". Many foreign scientists, however cling to the genus Anhalonium and distinguish between Anhalonium williamsii and Anhalonium lewensii.

In ancient times peyote was called teonanacatl, teonanctl, peiotl, sacred mushroom, nonacatl and riaz diabolica or devil's root. Various Indian tribes knew it as kikora, kikuli, ho, semi, wokowi, xicori and kamaba.

The plant is not cultivated but grows in the wild. It attains the height of about one-half inch; grows in barren rocky soil and is gathered

with great difficulty. It collection by Indians of earlier days was accompanied by ritual and ceremony. The plant was dried and preserved; either cut into longitudinal strips called "riaz diabolica" or the tops only were retained. The latter resembled mushrooms and were called "teonanacatl" meaning, "Gods flesh or sacred mushroom."

It was probably the sacred "Mushroom of the Aztecs" who like some of the present day Indians, used it in their religious rites, attributing divine properties to it.

The use of "peyote" in the United States was first cited by James Mooney of the Bureau of American Ethnology (1891) in a paper on the subject read before the Anthropological Society. He called attention to its use by the Kiowa Indians living in the Rio Grande valley, the Comanches who formerly lived in Chinhuahua, Mexico and the Mescalero Apaches of New Mexico. Peyote is now used by many Indian tribes in the northern and western states.

The effects of peyote may be summarized as follows: At the outset there is cerebral excitement attended with extraordinary visual hallucinations. These are characterized by incessant flow of visions of grandeur and of vivid color and forms.

There is none of the excitement and jovial euphoria characteristic of cannabis sativa intoxication. Instead there is a quietness and awe the latter resulting probably from the hallucinatory experiences.

Besides the mental reactions produced by the alkaloids of "peyote" there are certain physical effects such as diminution in the cutaneous sensibilities to pain and touch; a general muscular weakness and tremulous

incoordination of muscular movements, varying in degree, sometimes amounting to almost complete palsy, accompanied by severe respiratory depression. There is a slowness in thinking and time relationship is much altered, not unlike that experienced in cannabis sativa poisoning. Whereas the use of the latter drug is followed by sleep, peyote produces no drowsiness, the individual remaining wide awake and fully aware of his surroundings.

The effects of frequent misuse of such powerful delerifacients as peyote and cannabis over any considerable period of time are unknown. The value of peyote as a remedial agent is suspect. It has been employed in the treatment of neuraesthenia and hysteria with disasterous results. There is no scientific evidence to support the inclusion of peyote in the armamentarium of medical practice.

Mescaline is the principal alkaloid of peyote with the composition $C_{11}H_{17}O_3N$ and contains three methoxyl groups and one aliphatic primary amino group. It is a derivative of Betaphenylethylamine. Spath, among others, has synthesized this alkaloid.

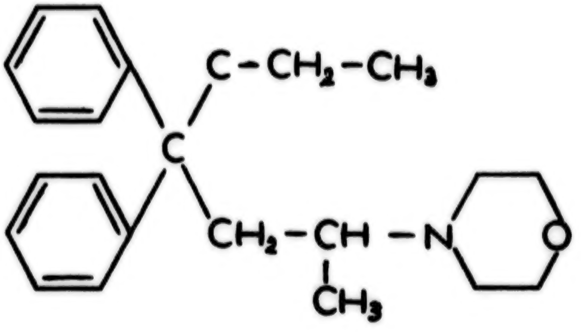
Anhalonidine, Anhalonine, lophophorine, pellotine and other related alkaloids found in peyote are considered true isoquinolines.

14. PHENADOXONE

CB-11, Hepagin; Heptalgin; Heptalin; Heptan; Heptazone; Heptone; 4,4-diphenyl-6-morpholino-heptanone; 6-morpholino-4, 4-diphenyl-3-heptanone. Schedule I; CSA Code #-9637; Import/Export permits required.

$C_{23}H_{29}NO_2$

Molecular weight - 351.47

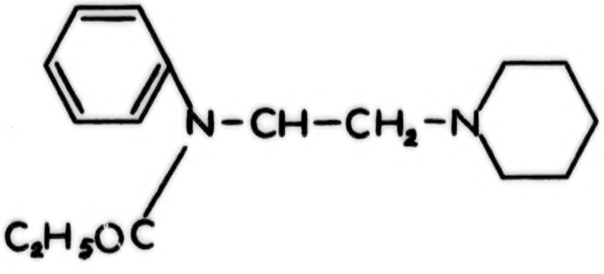


15. PHENAMPROMIDE

N-(1-methyl-2-piperidinoethyl)-propionanilide; N.I.H.-7602; Schedule I; CSA Code #-9638; Import/Export permits required.

$C_{17}H_{26}N_2O$

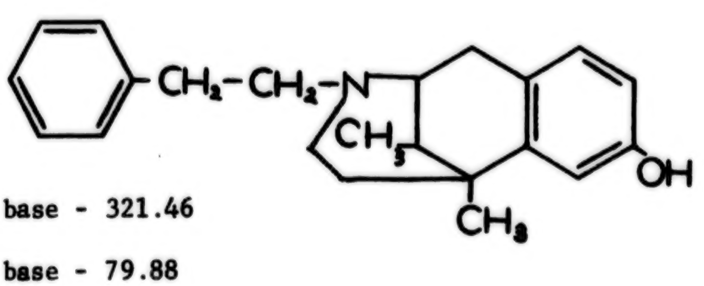
Molecular weight - 274.41



16. PHENAZOCINE

Prinadol (SKF); SKF-6574; N.I.H.-7519; 2'-hydroxy-5, 9-dimethyl-2-(2-phenethyl)-6,7-benzomorphan; Schedule II; written Rx; CSA Code #-9715; Import/Export permits required.

$C_{22}H_{27}NO$



Molecular weight - 321.46

HCL - Percentage of anhydrous base - 321.46

HBr - Percentage of anhydrous base - 79.88

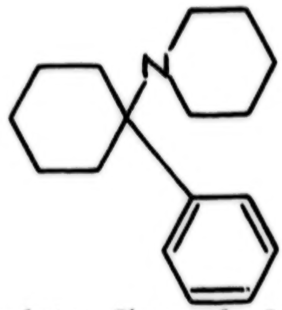
Phosphate - 69.51

17. PHENCYCLIDINE

1-(1-phenylcyclohexyl) piperidine; Sernyl; PCP; Schedule III; written Rx; CSA Code #-7471; Form 236.

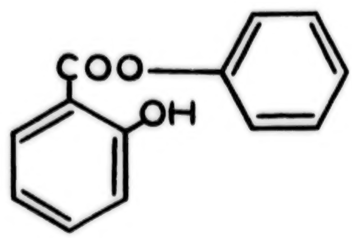
$C_{17}H_{25}N$

Molecular weight - 243.38



18. PHENETSAL

Acetyl-para-aminophenyl-salicylate; Phenosal; Salophen; Used as an analgesic and antipyretic in combination with codeine and other controlled substances. Not controlled under C.S.A.



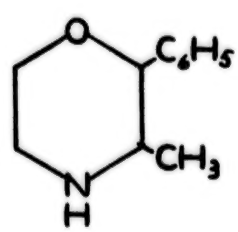
19. PHENMETRAZINE

3-methyl-2-phenylmorpholine; 3-methyl-2-phenyltetrahydro-24-1, 4-oxazine; Preludin; written Rx; Schedule II; CSA Code #-1630; Import/Export permits required.

$C_{11}H_{15}NO$

Molecular weight - 177.24

HCL - Percentage of anhydrous base - 82.92

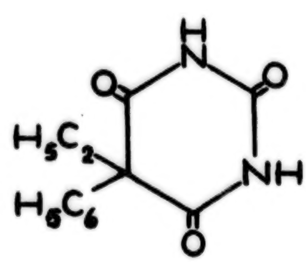


20. PHENOBARBITAL

5-ethyl-5-phenylbarbituric acid; phenylethylmalonylurea; Schedule IV; CSA Code #-2285; oral Rx; Form 236.

$C_{12}H_{12}N_2O_3$

Molecular weight - 232.23

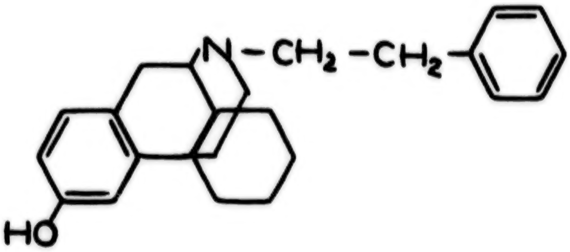


21. PHENOMORPHAN

N.I.H-7274; 3-hydroxy-N-phenethyl-morphinan; its racemic and levorotatory forms but excepting its dextrorotatory form; Schedule I; CSA Code #-9647; Import/Export permits required.

$C_{24}H_{29}NO$

Molecular weight - 347.41

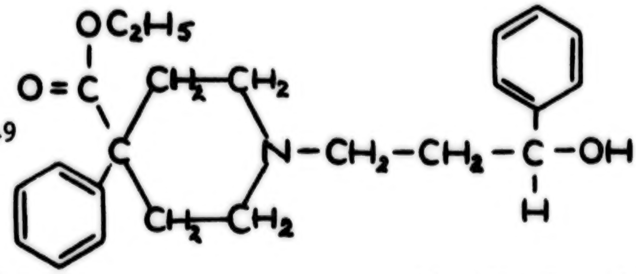


22. PHENOPERIDINE

1-(3-hydroxy-3-phenylpropyl)-4-phenylpiperidine-4-carboxylic acid ethyl ester; Schedule I; CSA Code #-9641; Import/Export permits required.

$C_{23}H_{29}NO_3$

Molecular weight - 367.49



23. 5-PHENYL-ALLYLBARBITURIC ACID (Barbituric acid derivative)

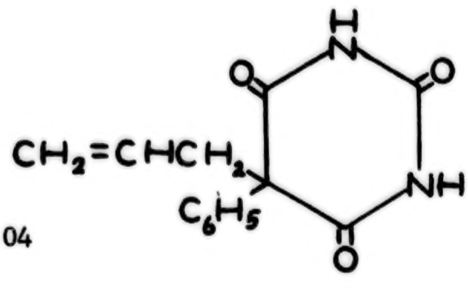
5-allyl-5-phenylbarbituric acid; Alphenal; Alphenal; Alphenate; Schedule III; oral Rx; CSA Code #-2100; Form 236.

$C_{13}H_{12}N_2O_3$

Molecular weight - 244.24

Na Salt - $C_{13}H_{11}N_2O_3$

Percentage of anhydrous base - 96.04

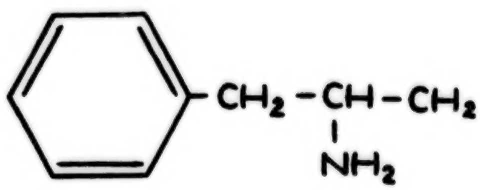


24. 1-PHENYL-2-AMINOPROPANE

Amphetamine; dl-alpha-methyl phenethylamine; Schedule II; written Rx; CSA Code #-1100; Import/Export permits required.

$C_9H_{13}N$

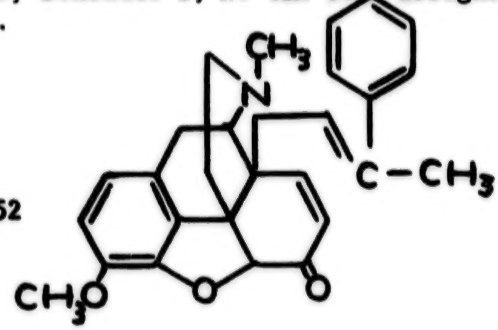
Molecular weight - 135.20



25. 14-(3-PHENYL-2-BUTEN-1-YL)-CODEINONE
a thebaine derivative; Schedule I; No CSA Code assigned; Import/Export permits required.

$C_{28}H_{29}NO_3$

Molecular weight - 427.52



26. PHENETHARBITAL
Phentharbital; 5,5-diethyl-1-phenylbarbituric acid; Schedule III; CSA Code #-2100; oral Rx; Form 236.

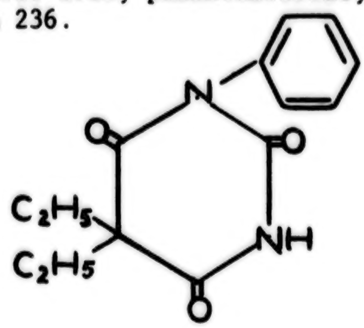
$C_{14}H_{16}N_2O_3$

Molecular weight - 260.28

27. PHETHARBITAL
5,5-diethyl-1-phenylbarbituric acid; phenetharbital; Schedule III; CSA Code #-2100; oral Rx; Form 236.

$C_{14}H_{16}N_2O_3$

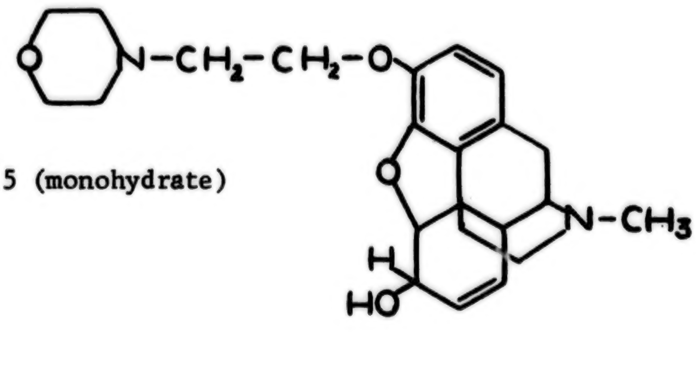
Molecular weight - 260.28



28. PHOLCODINE
3-[2-(4-morpholinyl)ethyl]morphine; tetrahydro-1, 4-oxazinylmethylcodeine; 3-(2-morpholinoethyl)-morphine; beta-4-morpholinylethylmorphine; hemocodeine; Schedule I; CSA Code #-9314; Import/Export permits required.

$C_{23}H_{30}N_2O_4 \cdot HOH$

Molecular weight - 416.5 (monohydrate)



29. PIMINODINE

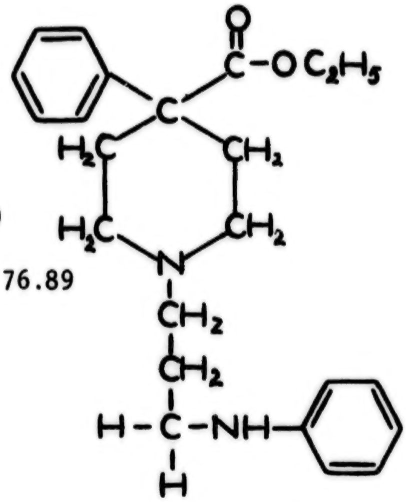
Alvodine; Ethyl-4-phenyl-1-/3-(phenylaminol-propyl)/-4-piperidine carboxylate; N.I.H.-7590; WIN-14098; a pethidine derivative; Schedule II; written Rx; CSA Code #-9730; Import/Export permits required.

$C_{23}H_{30}N_2O_2$

Molecular weight - 366.51

Dichloride - Percentage of anhydrous base - 83.40

Ethanesulfonate - Percentage of anhydrous base - 76.89

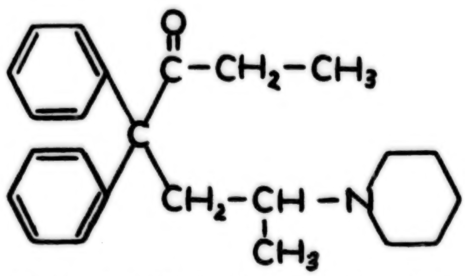


30. PIPERIDYLMETHADONE

Dipipanone; 4, 4-diphenyl-6-piperidino-3-heptanone; Schedule I; CSA Code #-9622; Import/Export permits required.

$C_{22}H_{27}NO_3$

Molecular weight - 353.44

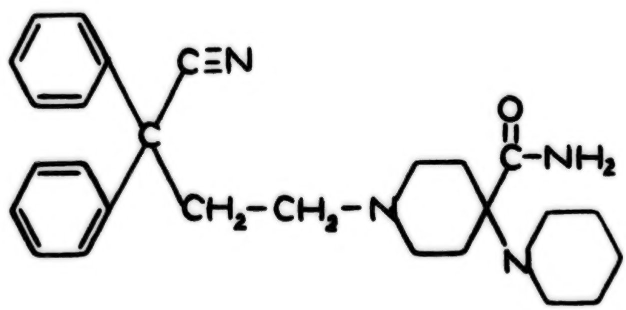


31. PIRITRAMIDE

1-(3-cyano-3, 3-diphenylpropyl)-4-(1-piperidino)piperidine-4-carboxylic acid amide; Schedule I; CSA Code #-9642; Import/Export permits required.

$C_{27}H_{34}N_4$

Molecular weight - 430.60



POPPY
(The opium poppy)

The opium poppy belongs to the family, Papaveraceae, which includes six genera, several species within each genus and many varieties within each specie.

Family - Papaveraceae

Genera

Glaucium — Meconopis — Papaver — Roemeria — Chelidonium — Hypecoum

Species

dubium — rhoeas — somniferum — argemone — hydridum — alpium

The genus Papaver contains about 110 species with over 600 sub-species and varieties. P. rhoeas is the common scarlet poppy. P. croceum, with a brilliant orange colored flower inhabits the high elevations of Europe. P. hydridum and P. pavonium are two wild species. The former with its prickly capsules and small but deep brick-red flowers and the latter with large salmon to orange flowers and black centers inhabit nearly all the temperate zones of the world. P dubium with its pinnatifid leaves and long slender stalks topped with bright orange to scarlet flowers whose beauty is accented with shiny black centers is commonly known as the "California Poppy, Eschscholtzia," named in honor of John Friedrich Eschscholtz.

Papaver somniferum, the only specie capable of producing opium, contains these principle varieties; namely, vigrum, album and abnormale. Other species and varieties have been reported to contain opium or some of its phenanthrene alkaloids; however, many taxonomists are of the opinion that these are actually somniferum hybrids. Only the specie, Papaver somniferum is controlled in the Controlled Substances Act.

The flowers of the opium poppy may be single or double with considerable variation in shapes and colors, (white, pink, red, purple, crimson or in combination). The white flowers are usually associated with the poppy fields of Asia Minor.

The capsules are of different shapes; i.e., elongated, globular or oblate. The seeds may be white, yellow, coffee colored, black, grey or blue. The seeds do not possess any narcotic alkaloids and therefore, are not subject to control. They are used primarily for culinary purposes, paints and perfumes. The popular poppy seed roll is a common staple in many countries while in India and Turkey poppy seed oil has been the only cooking oil for centuries.

The present day opium poppy had its genesis in a wild variety, Psetigerum, inhabiting the shores of the Mediterranean Sea. Through centuries of cultivation and breeding, the somniferum specie evolved and is the only plant cultivated for its opium alkaloids.

The opium poppy will grow in almost all kinds of soils, but does best in a sandy-loam mixture because of its optimum moisture retention ability. Excessive moisture or extreme arid conditions will adversely affect its growth thus reducing the alkaloid content.

The opium poppy is indigenous to many climates growing from the southern most tip of Africa to latitudes as far north as Moscow. In the late 19th Century, prior to restrictive controls, opium poppies were extensively cultivated for medicinals in the United States from New England to California. Many East European immigrants cultivated "back yard gardens" of opium poppies from seeds brought with them. However, they were more concerned with having supplies of seed and oil for culinary purposes rather than the production of opium.

Papaver somniferum is generally described by the taxonomist as having stems from 2 to 5 feet high, simple or divided with smooth surfaces, rarely setigerous. Leaves are oblong or ovate, toothed and lobed, occasionally pinnately lobed ranging from 4 to 15 inches long by 1 to 9 inches wide. The flowers will range from 2 to 8 inches in diameter with 2 sepals and 4 petals, either toothed or fringed and ranging in color from white to shades of purple to scarlet. The seed capsules are ovate to oblong or round to ovate. The sessile stigma number 3 to 16 and crown the top of the ovary. Each pod contains hundreds of seeds. The antherida (anthers-male flowing part) surrounds the ovary and produce pollen for fertilization.

The epidermis or skin of the pod encloses the pericarp or wall of the ovary. The ovary wall consists of three layers; namely, the epicarp or outer layer, the mesocarp, the middle layer and the endocarp, the inner layer. The latex (opium) is absorbed by a network of fine vessels in the endocarp and then transferred to a network of intercellular tubes contained in the middle layer or mesocarp. Hence, the storage cells of the mesocarp secrete over 95% of the opium when the pod is scarified.

The opium yield of a capsule varies greatly from 0.01 grams to 0.1 grams. The normal capsule produces about 0.08 grams (80 mg. or 1 1/3 grains). While being relatively high in natural codeine (approximately 3.5%), Indian opium is usually lower in morphine content averaging 8.5 to 12%. On the other hand, Turkish opium contains a higher morphine content (average 12.5%) but a lower codeine content usually less than 1%. Iranian opium has about 2.5% codeine and 11% morphine. Many etological factors and variables determine the yield. Six to 8 kilograms of opium is generally considered the average yield per acre.

U.S.P. paregoric standards are based on Turkish opium. However, since Turkish opium is no longer available, these standards will need revision.

The biosynthesis of the phenantherene alkaloids is believed to begin with thebaine which in turn is converted to codeine. The codeine is demethylated to morphine which is the ultimate alkaloid that the plant desires to produce. One can readily see that early scarification of the pods will result in opium with lower morphine content but a higher codeine content. Therefore, to insure that the opium will have a high morphine content, the harvesting must be accomplished at the proper time.

1/"There appears to be at present no comprehensive classification of the varieties of the plant P. somniferum. Professor Duston sent some plants to the Royal Botanic Gardens, Kew, for their classification but attempts to divide the specimens into mutually exclusive groups were unsuccessful and it was reported that a satisfactory classification of the various forms could only be accomplished in the field by a careful observer and a judicious cultivator. Since then, no further attempts have been made to classify them. On the other hand, due to cross fertilization of different varieties, a number of hybrids and new races may have come into being.

Broadly speaking, the many varieties of Indian opium poppy may be separated into two well-defined races by the color and texture of the capsules. One has capsules of an opaque green in deeper or paler shades. This comprises the subza-dheri varieties. The other has glaucous capsules, more or less densely coated with an opaque white powder. This is the sufaid-dheri group. The sufaid-dheri race may be indifferently used for late or early crop, and, with the exception perhaps of the Kaladanthi variety, the later crops may not

1/THE CULTIVATION OF THE OPIUM POPPY IN INDIA, by S.N. Asthana, M.Sc., District Opium Officer, Bareilly, Bulletin On Narcotics, September-December 1954.

be wanting in vegetative vigor; however they will be found to yield much less opium. Under a March sun, the latex of the subza-dheri is very rapidly exhausted and scarcely half of its normal opium content can be extracted. This species has, however, special adaptability for early sowing. The characteristics of the two species are probably due to the difference in the texture of the capsule-that with the white powdery coating better resisting evaporation action in high temperature and a dry atmosphere than the other.

The poppy in India is grown on almost all kinds of soils, viz. clayey (Kali Matti), sandy loam (Domat I), loamysand (Domat II), sandy (Bhoor) and sandy clay but the plant prefers a soil of a sandy loam type. Such soil presents a uniform appearance and is fairly retentive and easily cultivable and productive.

The clayey type is rather hard and it is difficult to pulverize it properly for the young roots of the poppy plants to penetrate it. The sand on the other hand does not retain water which quickly percolates down and, therefore, the moisture retained is insufficient for the healthy growth of the plant.

The fertility of the soil can be improved just by effective drainage. Insufficient tillage, root injuries of young crops, insufficient supply of sap and the surcharging of the plant with an over-diluted food due to water-logging has a most deleterious effect on the poppy. The plants become poor and stunted, the leaves are narrow of a palish green color. The stalks are spare and simple and tend to flower prematurely giving a low amount of capsules.

To the opium poppy cultivator the weather is a very important element. A hailstorm, for example, and by no means a severe one, will ruin his crop while a heavy rainfall between the period of scarification of the capsules and the collection of the latex will leave little or none for collection. High or gusty winds are also detrimental during the opium season because they dry up the plant and thus check the exudation of latex. Whatever latex flows dries quickly so that when the capsules rub together, the opium is lost. Dull, cloudy or rainy weather tends to reduce, not only the quantity, but the quality of the drug exudations.

The poppy is a delicate plant and needs utmost care and attention during the entire period of its growth from the seedling stage until the capsules ripen. Unfortunately, the poppy plant has many enemies against which it has to fight during its life period. Apart from natural calamities like sunburning, hail and frost, it has also to suffer from many insects, birds and other animals. Fungus and virus diseases also take their toll.

No sooner do the seeds germinate and the seedlings sprout two to four leaves, than a small insect locally known as Dhirku or Gadhiya starts the trouble. This insect hops from one plant to another and clips off the young terminal shoot with the result that the plant is incapacitated for normal growth.

The cutworm often commits havoc on the growing crop. Its ravages extend in the dry season from November to January. These cutworms remain burrowed in the soil during the day and come out only at night to carry on their depredations. In the night hundreds of these worms can be seen on the leaves of the plants which they cut. The entire leaf is eaten away by these cutworms

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except the midrib and the affected plants die after a few days. The loss from this worm is sometimes enormous. The only remedy is to flood the fields with water. By doing so these cutworms float on the surface and are picked by their enemies-the birds.

The cricket, Gryllotalpa vulgaris is often a very serious pest, cutting over with its mandibles plants almost fully grown.

The caterpillars of a moth also prove very serious enemies to the growing crops, their ravages extending from December to February. In this case also irrigation dislodges them from their soil haunts and they are eaten away by their natural enemies: the Indian crow and myna.

Rats, rabbits, monkeys, blue bulls and parrots also destroy the crop considerably. The poor cultivator has to save his crop during the day from monkeys and parrots and during the night from rabbits and blue bulls. In good irrigated fields, rats are not a great menace because they are easily dislodged from poppy fields. They run to make their homes in an adjoining field where they find less danger from water and better food like wheat or germ. The damage from blue bulls is sometimes very great. Once they get addicted to the poppy leaves and stems containing latex they will not eat anything else. Apart from eating them, they also destroy the plants by breaking them with their strong hoofs while running through fields. Hindus consider it irreligious to kill them. They consider killing it as bad as killing a cow.

In sunburning (Moorka or Joorka), the leaves get dried and wither, with more or less discolored purplyblack or brownish veins, the pith decaying from above downward. Plants exhibit these symptoms, both in poor and rich soils,

when the weather is hot and there is a deficiency of moisture in the soil. Under these conditions the roots fail to keep pace with the leaf transpiration.

Frost is also sometimes very destructive. During heavy frost the thermal balance of the protoplasm of the cells is lost. The protoplasm, in such cases, shrinks and the cells die. The only remedy for this appears to be to water the fields profusely the morning after the frost when the plants will again try to regain their proper balance and the crop may be saved. There is hardly any remedy against hail except the prayers of the cultivators.

The most serious poppy mold is Peronospora arborescens. It is, however, not so destructive as its other species Peronospora infestens to the potato. The less succulent structure of the poppy is evidently unfavorable to any rapid or general extension of the mycelium. The disease is commonly known as Chirrah or Agiya.

The pale rose colored patches of Dactylliumroseum thread mold are very common on the poppy during moist, warm weather. In the opium godowns and, in fact, on opium everywhere, it finds a favorite media covering the surface with its rosy web of mycelia when left for any time undisturbed.

Other species of fungi reported on the poppy plants are Trichodermaviride, Sporotrichum Sp., Cladosporium herbarium, Rhizomorpha Sp., Mucor mucedo, Aregma moniliforme and Phelipea indica. None of these, however, cause any serious damage to the crop.

Poppy plants suffering from leaf curl disease are very frequently found in the fields. Sometimes it is devasting. The symptoms are identical to the potato and tobacco mosaic and it is surmised that this may also be a

virus disease. The only method of eradication is to pluck the diseased plants as they appear and burn them. Plants with gangrene and root cancer are also occasionally met with."

POPPY STRAW

Schedule II; CSA Code #-9041; Import/Export permits required.

Poppy straw means all parts of the opium poppy plant after mowing. The commercial manufacture of morphine directly from the plant (straw) dates from the 1920's when it was begun in Hungary by Jonas Von Kabay.

The original conception was that a field of green poppies would be mowed like hay, before maturity, and then processed for alkaloids. However, as soon as it was learned that morphine did not disappear when the juice dried up, but remained in the mature dried plant (at least as long as it was not washed out by rain), it became possible to use the poppies both for seed and alkaloids. Consequently, the extraction of morphine became a by-product industry, as the poppy was already grown in Hungary for its edible and oil producing seed. At first the whole dried poppy plant was cut off for processing, and the term "poppy straw" for this material came into international use. As soon as reliable analyses were available, it was clear that nearly all the morphine was obtained from the capsule. The industry then began to use poppy capsules with as little stem as possible.

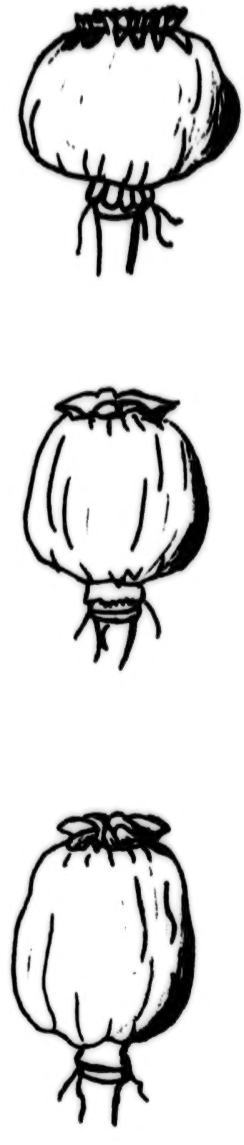
The manufacture of morphine direct from the dried poppy plant soon spread to Poland and later to other countries, and, is now commonplace in most countries where poppies are grown primarily for their seed. The manufacture of morphine from poppy straw as a by product industry is limited by the extent of poppy cultivation for poppy seed.

The yield per hectare differs greatly from country to country and often from year to year. However, a fair average seems to be 675 kilograms of poppy seed per hectare, and about two-thirds as great a weight of dry capsule chaff, or 450 kilograms per hectare. About 3 kilograms of morphine is a good practical yield per ton of capsule chaff. This average may be reduced by rain and in this case morphine production may be low even when the crop of poppy seed has been entirely satisfactory.

Under the present economic conditions there is no indication that poppy straw is likely to replace opium as a principal source of morphine for medical purposes, particularly since thebaine, a starting material for oxycodone and other drugs, is much in demand and cannot be obtained from the poppy straw.

In the interest of cheaper methods for producing morphine led to the development of more modern processes that were put into effect in Germany and Hungary. Thirty tons of anhydrous morphine were obtained from 10,910 tons of straw or a yield of 0.27%. Later Frey and Wuest of Switzerland patented a live water extraction process who proved to be as effective as the Kabay method.

PAPAVER SOMNIFERUM - variety-Katila



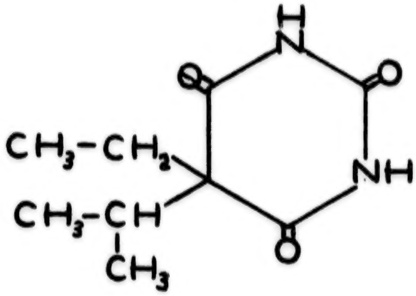
Different types of capsules
from different varieties

PLATE NO. 7

32. PROBARBITAL
5-ethyl-5-isopropylbarbituric acid; Ethylpropylmal; Irenal; Ipral; Schedule III; oral Rx; DEA Code-2100; Form 236.

$C_9H_{14}N_2O_3$

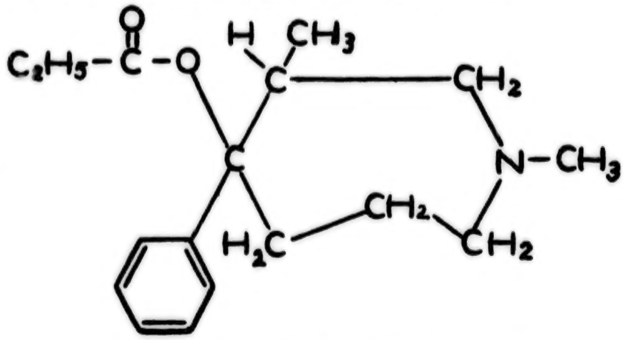
Molecular weight - 198.22



33. PROHEPTAZINE
Proheptazone; 1,3-dimethyl-4-phenyl-4-propionoxyhexamethyleneimine; Schedule I; DEA Code #-9643; Import/Export permits required.

$C_{17}H_{25}NO_2$

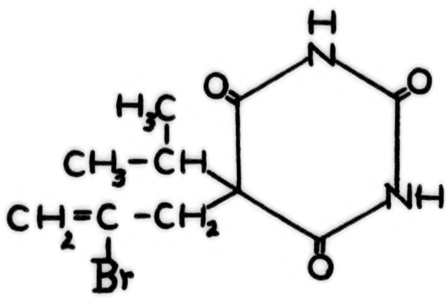
Molecular weight - 275.38



34. PROPALLYLONAL
5-(2-bromoallyl-5-isopropyl) barbituric acid; Schedule III; DEA Code #-2100; oral Rx; Form 236.

$C_{12}H_{13}N_2BrO_3$

Molecular weight - 289.14



35. PROPIRAM
N-(1-methyl-2-piperidinoethyl)-N-2-pyridylpropionamide; N-propionyl-2-(1-piperidinoisopropyl) aminopyridine Schedule I; DEA Code #-9649; Import/Export permits required.

$C_{16}H_{25}N_3O$

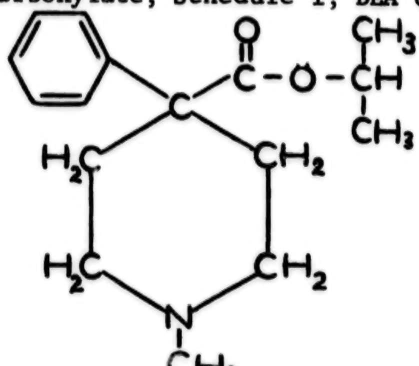
Molecular weight - 275.38

Fumarate Salt - 70.38

36. PROPERIDINE

Gevelina; Ipropethidine; Isopedine; Spasmodolosina; Isopropyl, 1-methyl-4-phenylpiperidine- 4-carboxylate; Schedule I; DEA Code #-9644.

Molecule weight - 261.34

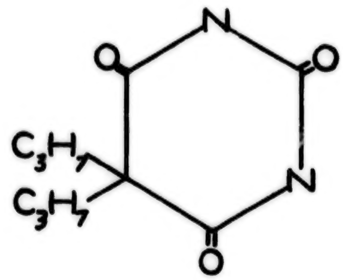


37. PROPYLBARBITAL

5,5-dipropylbarbituric acid; Schedule III; DEA Code #-2100; oral Rx; Form 236.

$C_{10}H_{16}N_2O_3$

Molecular weight - 198.19

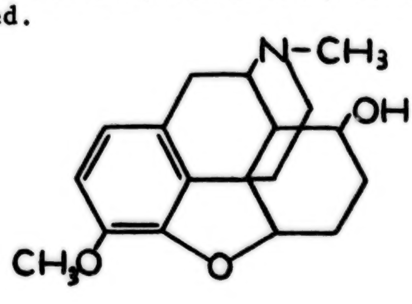


38. PSEUDOCODEINE

Neoisocodeine; an isomer of codeine; Schedule I; No DEA Code assigned; Import/Export permits required.

$C_{18}H_{21}NO_3$

Molecular weight - 299.36

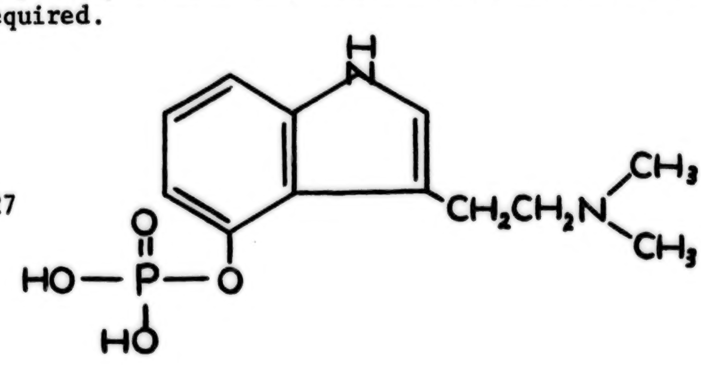


39. PSILOCYBIN

3-[2-dimethylamino)ethyl]indole-4-ol dihydrogen phosphate ester; o-phosphoryl-4-hydroxy-N, N-dimethyltryptamine; cy-39; psilotsibin indocybin; derived from the fungus, psilocybe mexicana; Schedule I; DEA Code #-7437; Import/Export permits required.

$C_{12}H_{17}N_2O_4P$

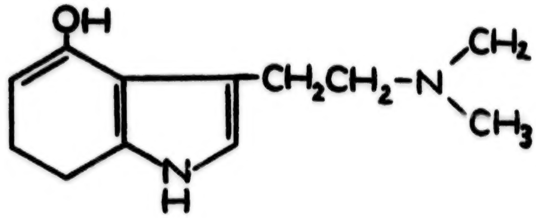
Molecular weight - 284.27



40. PSILOCYN
3[2-(dimethylamino)ethyl] indole-4-ol PSILOTSIN: C x 59; derived from the fungus, Psilocybe mexicana; Schedule I; CSA Code #-7438.

$C_{12}H_{15}ON_2$

Molecular weight - 203.27

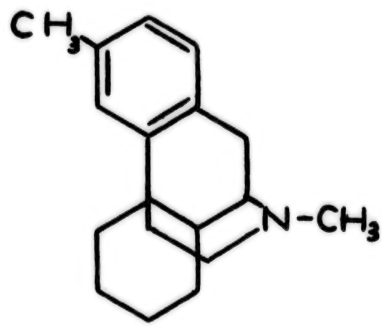


1. RACEMETHORPHAN
3-methoxy-N-methyl-morphinan; dl-1,2,3,9,10,10a hexahydro-6-methoxy-11-methyl-4H-10, 4a-iminoethano-phenanthrene; RO1-5470; Schedule I; CSA Code #-9732; Import/Export permits required.

The methorphans occur in the usual three optical isomers. i.e., the dextro, levo and racemic. The levo and racemic forms exhibit potent addictive liabilities and are under full control both nationally and internationally. However, the dextro form possesses no addictive liabilities and is controlled only at our national levele.

$C_{18}H_{25}NO$

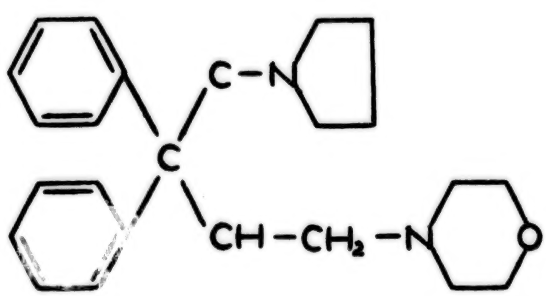
Molecular weight - 271.38



2. RACEMORAMIDE
dl-3-methyl-2, 2-diphenyl-4-morpholino-butyrlpyrrolidine; R-610; Schedule I; CSA Code #-9645; Import/Export permits required.

$C_{25}H_{32}N_2O_2$

Molecular weight - 392.55

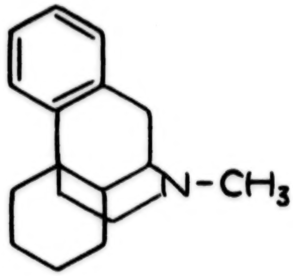


3. RACEMORPHAN

dl-3-hydroxy-N-methmorphinan; dl-1,2,3,9,10,10a-dexahydrol-11-methyl-4H-10, 4a-iminoethanophenanthrene 6-ol; Schedule I; CSA Code #-9733; Import/Export permits required.

$C_{17}H_{23}NO$

Molecular weight - 257.16



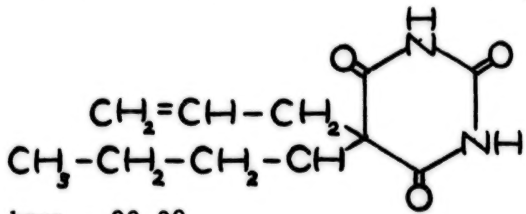
1. SECOBARBITAL

5-allyl-5-(1-methylbutyl) barbituric acid; Seconal (Lilly); Schedule II; CSA Code #-2315; written Rx; Import/Export permits required.

$C_{12}H_{17}N_2O_3$

Molecular weight - 237.29

Na - Percentage of anhydrous base - 92.20

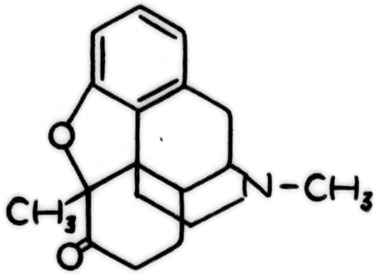


2. SN-DIMETHYL-3-HYDROXY-6-OXO-4, 5-EPOXYMORPHINAN

Methyldihydromorphinone; Metopon; Schedule I; CSA Code #-9620; Import/Export permits required.

$C_{18}H_{21}NO_3$

Molecular weight - 299.36

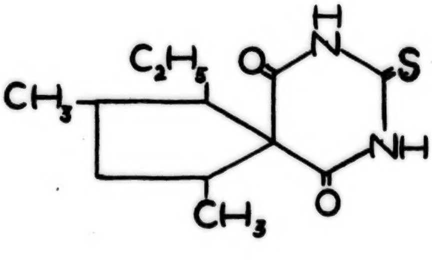


3. SPIROBARBITAL

Spirothiobarbital; Spirothal; 5-spiro-(2-barbituric acid; Schedule III; CSA Code #-2100; Form 236.

$C_{12}H_{18}N_2O_2$

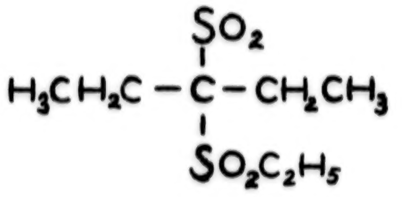
Molecular weight - 254.36



4. **SULFONDIETHYLMETHANE**
Tetranal; Schedule III; CSA Code #-2600; Form 236.

$C_9H_{20}O_4S_2$

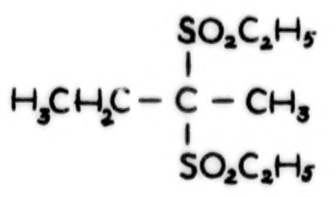
Molecular weight - 258.39



5. **SULFONETHYLMETHANE**
2, 2-Bix (ethylsulfonylbutane); trional methylsulfonal, ethylsulfonal; the ethyl analog of sulfonmethane; Schedule III; CSA Code #-2605; Form 236.

$C_8H_{18}O_4S_2$

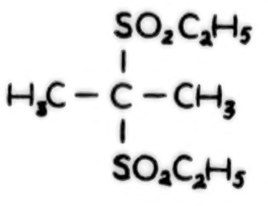
Molecular weight - 242.36



6. **SULFONMETHANE**
2,2-Bis (ethylsulfonylpropane); Sulfonal; propanediethylsulfone. Schedule III; CSA Code #-2610; Form 236.

$C_7H_{16}O_4S_2$

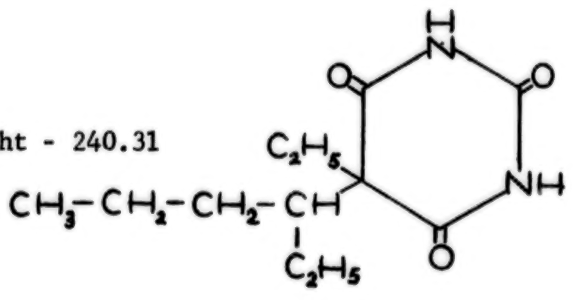
Molecular weight - 228.33



1. **TETRABARBITAL**
5-ethyl-5(1-ethylbutyl) barbituric acid; Tetramal; Schedule III; CSA Code #-2100; Form 236.

$C_{12}H_{20}N_2O_3$

Molecular weight - 240.31

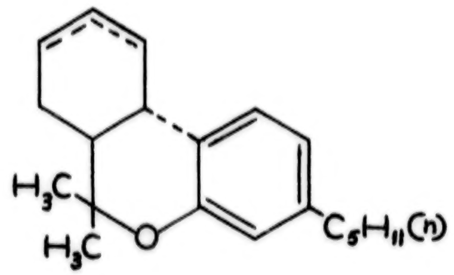


2. TETRAHYDROCANNABINOL(s)

Also several transisomers, both natural and synthetic; a principal alkaloid of marihuana; Schedule I; CSA Code #-7370; Import/Export permits required.

$C_{21}H_{30}O_2$

Molecular weight - 314.45

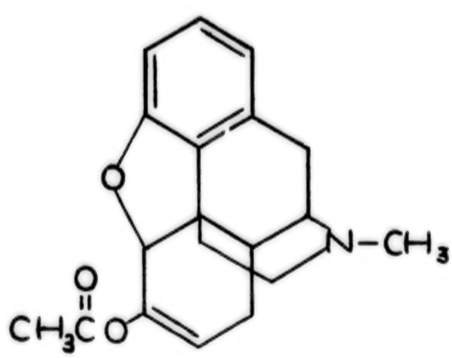


3. THEBACON

Acetylated enol form of hydrocodone; Acetyldihydrocodeinone; acetyldemethylodihydrothebaine; Acedicon; Schedule I; CSA Code #-9315; Import/Export permits required.

$C_{20}H_{23}NO_4$

Molecular weight - 341.39

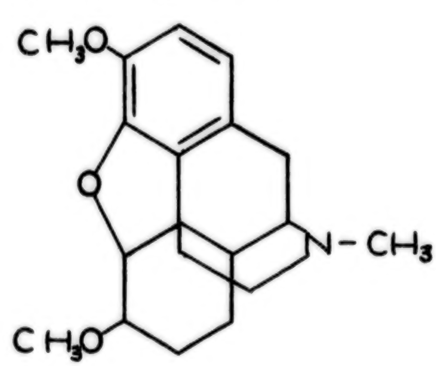


4. THEBAINE

One of the principle phenanthrene alkaloids of opium occuring in opium from 0.3-1.5%. It is without medical utility, however, is the starting compound for many derivatives such as oxycodone, oxymorphone, etc.; Schedule II; CSA Code #-9333; Import/Export permits required.

$C_{19}H_{21}NO_3$

Molecular weight - 311.37

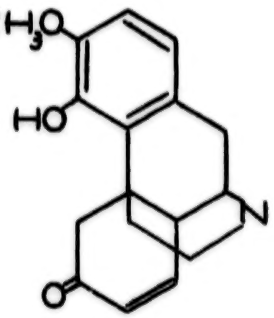


5. THEBAINONE

A ketonic compound derived from thebaine by hydrolysis of the enol ether group and the simultaneous reductive scission of the 4,5-ether bridge (small-Chemistry of the Opium Alkaloids-suppl. No. 103) Schedule I; No CSA Code assigned; Import/Export permits required.

$C_{18}H_{21}NO_3$

Molecular weight - 299.36



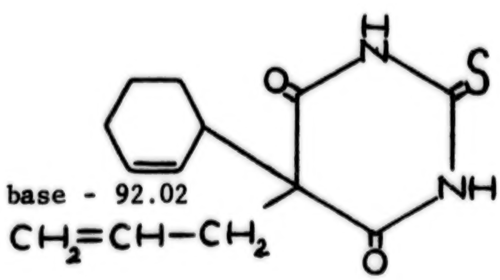
6. THIALBARBITAL

5-allyl-5(2-cyclohexen-1-yl)-2-thiobarbituric acid; thialpenton; thialbarbitone; Schedule III; CSA Code #-2100; Form 236.

$C_{13}H_{16}N_2O_2S$

Molecular weight - 264.36

Na Salt - Percentage of anhydrous base - 92.02

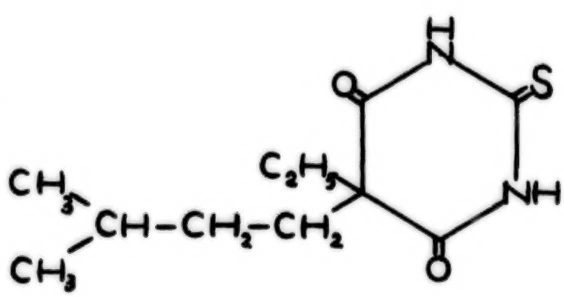


7. THIOAMOBARBITAL

5-ethyl-5-isopentyl-2-thiobarbituric acid; thioamytal; Schedule III; CSA Code #-2100; Form 236.

$C_{11}H_{17}N_2O_2S$

Molecular weight - 241.5

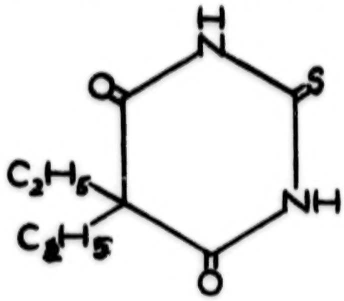


8. **THIOBARBITAL**

5,5-diethyl-2-thiobarbituric acid; Certodorm; Ibition; Schedule III; CSA Code #-2100; Form 236.

$C_8H_{12}N_2O_2S$

Molecular weight - 200.26

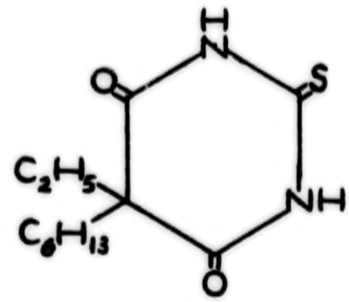


9. **THIOHEXETHAL**

5-ethyl-5-hexyl-2-thiobarbituric acid; Schedule III; CSA Code #-2100; Form 236.

$C_{12}H_{20}N_2O_2S$

Molecular weight - 256.16

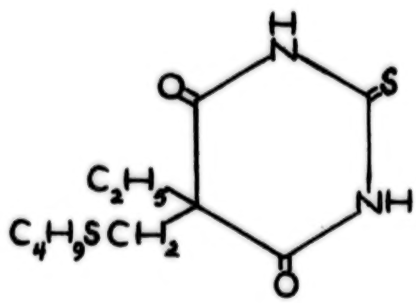


10. **THIONARCON**

5-[(Butylthio)methyl]5-theyl-2-thiobarbituric acid; Schedule III; CSA Code #-2100; Form 236.

$C_{11}H_{18}N_2O_2S_2$

Molecular weight - 274.41

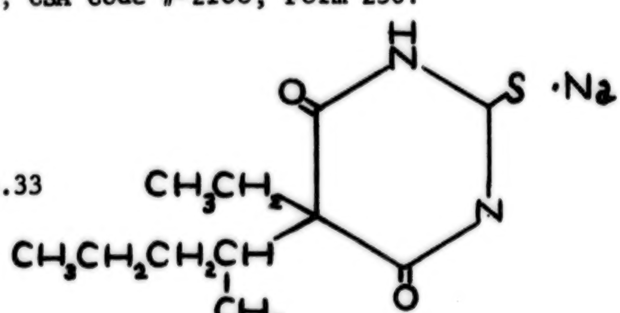


11. **THIOPENTAL**

5-ethyl-5-(1-methylbutyl)-2-thiobarbituric acid; Pentothal sodium (Abbott); Schedule III; CSA Code #-2100; Form 236.

$C_{11}H_{17}N_2O_2S$

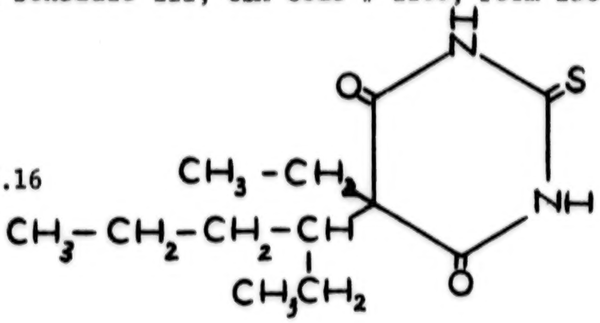
Molecular weight - 264.33



12. THIOTETRABARBITAL
thionarcex; thiotetramal; thiotetramalum; 5-ethyl-5-(1-ethylbutyl)-2-thiobarbituric acid; Schedule III; CSA Code #-2100; Form 236.

$C_{12}H_{20}N_2O_2S$

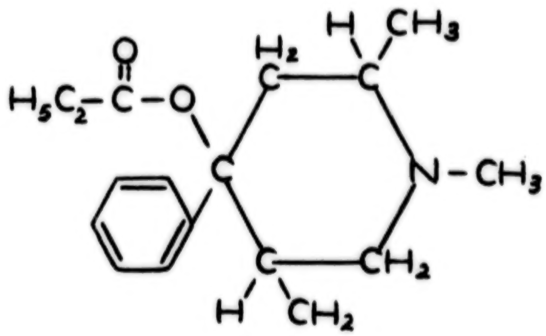
Molecular weight - 256.16



13. TRIMEPERIDINE
Promedol; 1,2,5-trimethyl-4-phenyl-4-propionoxypiperidine; Schedule I; CSA Code #-9646; Import/Export permits required.

$C_{17}H_{25}NO_2$

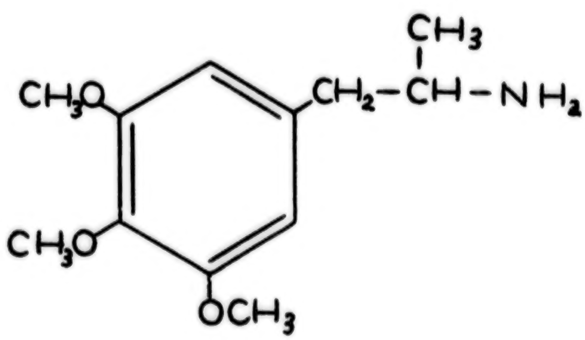
Molecular weight - 275.38



14. 3,4,5-TRIMETHOXYAMPHETAMINE
trimethoxyphenyl-b-amino propane; TMA; also the alpha form TMA-2; Schedule I; CSA Code #-7390.

$C_{12}H_{19}O_3N$

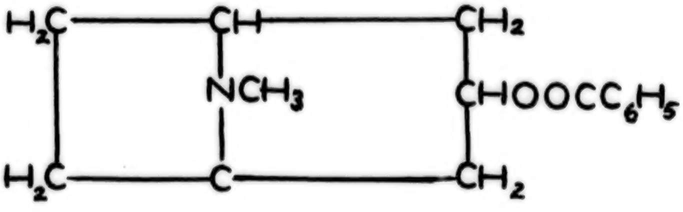
Molecular weight - 225.29



15. TROPACOCAINE
Pseudotropine; benzyolpseudo-tropeine; Schedule I; CSA Code #-9045. Tropaco·aine occurs only in Java coca leaves.

$C_{15}H_{19}NO_2$

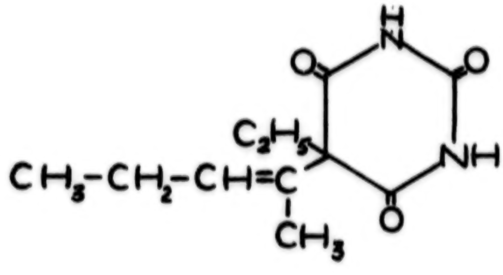
Molecular weight - 245.31



1. VINBARBITAL
5-ethyl-5-(1-methyl-1-butenyl) barbituric acid; Altepose; Butenemal; Schedule III; CSA Code #-2100; Form 236.

$C_{11}H_{15}N_2O_3$

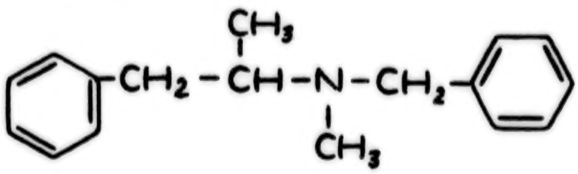
Molecular weight - 223.26



ADDENDUM

1. BENZPHETAMINE
N-Benzyl-N, alpha-dimethyl-phenylamine; Didrex (Upjohn); Schedule III; CSA Code #-1230; oral Rx; Form 236.

$C_{17}H_{21}N$



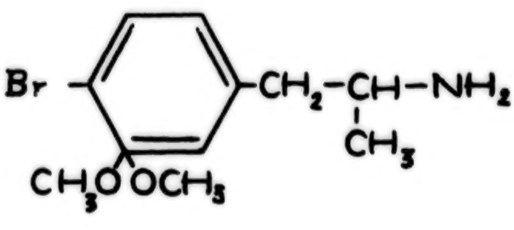
Molecular weight - 239.35

HCL - Percentage of anhydrous base - 86.78

2. 4-BROMO-2,5-DIMETHOXYAMPHETAMINE
4-bromo-2, d-dimethoxy-alpha-methyl-phenethylamine, 4-bromo-2,5; DMA; Schedule I; CSA Code #7291; Export/Import permits required.

$C_{11}H_{19}O_2N$

Molecular weight - 197.279



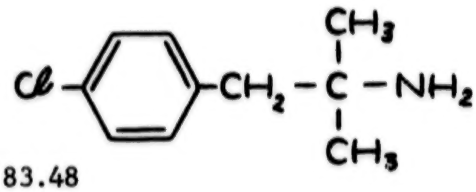
306-877 O - 79 - 17

V

[redacted]-

3. CHLORPHENTERMINE
Para-chloro-alpha, alpha-dimethylphemethylamine. Pre-sate (Warner); a phenethylamine derivative; Schedule III; CSA Code #-1645; Form 236.

$C_{10}H_{14}Cl\ N$

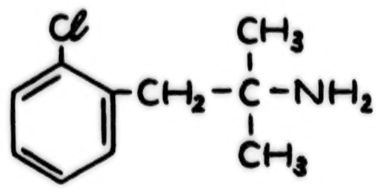


Molecular weight - 183.69

HCL - Percentage of anhydrous base - 83.48

4. CHLORTERMINE
Voranil (USV); Schedule III; oral Rx; CSA Code #-1647; Form 236.

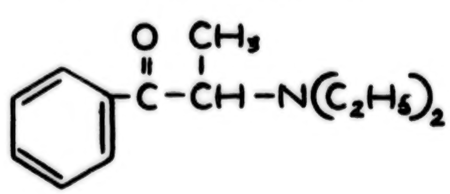
$C_{10}H_{15}N \cdot Cl$



Molecular weight - 185.19

5. DIETHYLPROPION
2, Diethylaminopropiophenone; 1-phenyl-2-diethylamino-1-propanone; Tenuate (Merrell); Schedule IV; CSA Code #-1610; Form 236.

$C_{13}H_{19}NO$



Molecular weight - 205.90

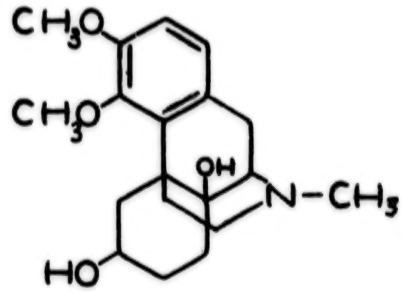
HCL - Percentage of anhydrous base - 84.95

6. DROTHEBANOL

3,4-dimethoxy-17-methyl morphinan-6 Beta, 14-diol; 6-14-hydroxy dihydro 6 Beta thebanol-4-methyl ether. Oxymethtebanol; Schedule I; CSA Code #-9335; Import/Export permits.

$C_{19}H_{32}O_4N$

Molecular weight - 325.367

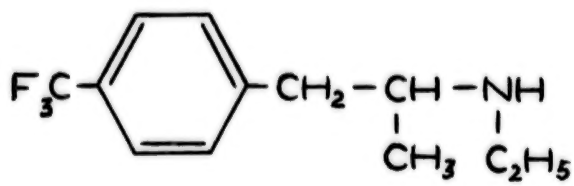


7. FENFLURAMINE

N-ethyl-alpha-methyl-m-(tuifluoromethyl)-phenethylamine; Ponderal, Ponderax; Pondimin (Robins); Schedule IV; oral Rx; CSA Code #-1670; Form 236.

$C_{12}H_{17}N \cdot F_3$

Molecular weight - 232.27

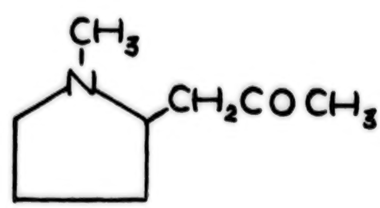


8. HYGRINE

2-Acetonyl-1-methylpyrrolidine; n-methyl-2-acetonylpyrrolidine; minor alkaloid occuring in the leaves of the coca bush; Schedule II; CSA Code #-   ; Import/Export permits.

$C_8H_{15}NO$

Molecular 141.21

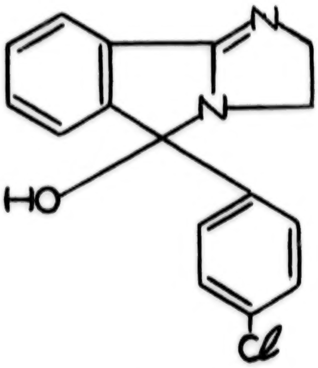


9. MAZINDOL

5-para-chlorophenyl-2, 3-dihydro-5 H-imidazo /2,1-a/ isoindole-5-ol; Sanorex (Snadoz); Schedule III; oral Rx; CSA Code #-1604; Form 236.

$C_{18}H_{14}N_2O \cdot Cl$

Molecular weight - 309.778

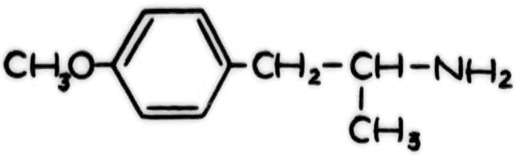


10. 4-METHOXYAMPHETAMINE

Para methoxyamphetamine; 4-methoxy-alpha methylphenethylamine; PMA*; Schedule I; CSA Code #-7411; Import/Export permits required.

$C_{10}H_{15}NO$

Molecular weight - 166.231



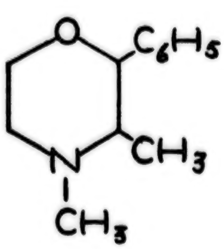
*PMA-Not to be confused with PMA-Phenylmercurie acetate, a herbicide.

11. PHENDIMETRAZINE

4,3-Dimethyl-2-phenylmorpholine; d-2-phenyl-3, 4-dimethylmorpholine; 3,4-dimethyl-2 phenyltetrahydro-1, 4-oxazine; Schedule III; CSA Code #-1620; Form 236.

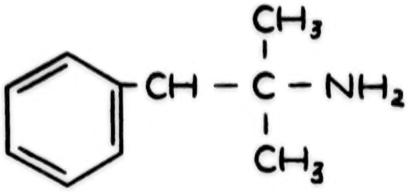
$C_{12}H_{17}NO$

Molecular weight - 191.26



12. PHENTERMINE

Alpha, alpha dimethylphenethylamine; phenyl-tert-butylamine; alpha benzylisopropylamine; Wilpo, (Merrell); Schedule IV; CSA Code #-1640; Form 236.



$C_{10}H_{15}N$

Molecular weight - 149.23

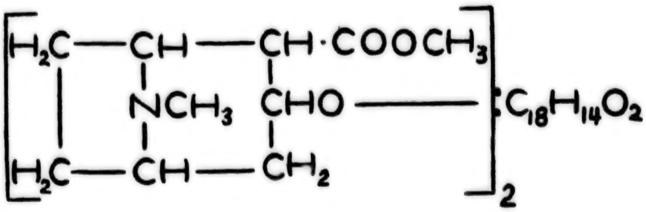
HCL - Percentage of anhydrous base -

13. TRUXILLINE

Amorphous alkaloid obtained from coca. Hydrolysis yields methanol, levo ecgonine and an acid; cocamine; alphatruxilline; r-isotropylcocaine; Schedule II; CSA Code #-9049; Import/Export permits required.

$C_{38}H_{46}N_2O_8$

Molecular weight - 658.80



APPENDIX NO. I

OPIUM AND COCA LEAVES IMPORTED INTO THE UNITED STATES BY CALENDAR YEARS 1925-1973

	OPIUM	COCA LEAVES		
Year	Kilograms	Medicinal Kilograms	Nonmedicinal Kilograms	Total Kilograms
1925	46,655.326	72,254.578	-	72,254.578
1926	64,837.217	133,347.054	-	133,347.054
1927	64,927.312	114,594.886	-	114,594.886
1928	44,586.041	110,667.347	-	110,667.347
1929	76,993.593	61,617.962	-	61,617.962
1930	54,243.805	89,699.155	-	89,699.155
1931	61,165.681	122,748.931	98,486.591	221,235.525
1932	59,292.455	101,624.340	-	101,624.340
1933	52,520.723	81,699.046	-	81,699.046
1934	61,454.272	81,070.364	4,480.807	85,551.171
1935	32,147.644	94,468.901	15,861.881	110,330.782
1936	87,188.438	101,855.814	69,533.820	171,389.634
1937	130,064.948	101,384.362	88,213.869	189,598.231
1938	64,335.020	101,041.220	107,540.455	208,581.675
1939	175,413.715	123,138.430	140,676.296	263,814.726
1940	109,385.208	146,189.403	206,011.141	352,200.544
1941	180,319.272	127,484.210	292,904.745	420,388.955
1942	108,293.842	89,849.520	270,806.401	360,655.921
1943	206,085.991	207,408.941	239,987.045	447,395.986
1944	59,082.162	67,555.253	134,501.985	202,057.238
1945	122,937.545	45,359.188	270,865.186	316.224.374
1946	118,347.111	90,718.971	138,063.956	228,782.927
1947	174,522.183	180,183.930	135,053.127	315,237.057
1948	181,443.413	289,375.064	-	289,375.064
1949	95,046.322	142,078.358	-	142,078.358
1950	324,673.408	112,742.530	-	112,742.530
1951	380,021.013	130,849.918	-	130,849.918
1952	381,662.923	112,354.213	-	112,354.213
1953	155,332.680	150,183.138	-	150,183.138
1954	208,717.526	125,392.754	-	125,392.754
1955	241,011.991	141,290.354	-	141,290.354
1956	186,074.728	184,095.849	-	184.095.849
1957	112,341.072	90,482.508	-	90,482.508
1958	173,467.908	112,501.219	-	112,501.219
1959	208,922.719	135,222.544	-	135,222.544
1960	148,777.256	109,614.560	-	109,614.560
1961	179,274.296	157,802.449	2,246.400	160,048.849
1962	163,310.986	106,999.885	20,227.838	127,227.723
1963	245,094.082	391,345.525	-	391,345.525
1964	121,794.480	380,163.320	-	380,163.320
1965	174,996.327	271,918.417	-	271,918.417

APPENDIX NO. I CON'T.

OPIUM		COCA LEAVES		
Year	Kilograms	Medicinal Kilograms	Nonmedicinal Kilograms	Total Kilograms
1966	173,951.307	264,964.851	-	264,964.851
1967	137,795.234	245,856.417	-	245,856.417
1968	122,974.169	299,415.011	-	299,415.011
1969	124,353.117	268,679.074	-	268,679.074
1970	204,004.727	287,731.555	-	287,731.555
1971	192,819.868	246,066.207	-	246,066.207
1972	269,061.695	575,814.351	-	575,814.351
1973	262,621.795	555,569.730	-	555,569.730

APPENDIX NO. I CON'T.

RAW OPIUM IMPORTED INTO THE UNITED STATES
BY COUNTRY

Year	Country		Kilograms
1964	India		59,797.183
	Turkey		61,997.297
		TOTAL	121,794.480
1965	India		32,728.239
	Turkey		142,268.088
		TOTAL	174,996.327
1966	India		75,728.632
	Turkey		98,222.675
		TOTAL	173,951.307
1967	India		78,161.896
	Turkey		59,633.338
		TOTAL	137,795.234
1968	India		74,992.801
	Turkey		47,981.368
		TOTAL	122,974.169
1969	India		90,745.569
	Turkey		33,607.548
		TOTAL	124,353.117
1970	India		172,965.683
	Turkey		31,039.044
		TOTAL	204,004.727
1971	India		184,823.602
	Turkey		7,996.266
		TOTAL	192,819.868
1972	Afghanistan		29,499.628
	India		239,561.817
	West Pakistan		.250
		TOTAL	269,061.695
1973	India		231,757.468
	Vietnam		13,001.559
	West Pakistan		10,857.306
	Turkey		7,005.472
		TOTAL	262,621.795

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TABLE - YEARLY PRODUCTION AND USE OF THE PRINCIPAL NARCOTIC DRUGS, 1967-1972*
(In Kilograms - as Salts)

1	2	3	4	5	6	7
Name of Drug	Year	Production	Total dispositions	Exported to other countries	Sold to Hospitals, Pharmacies, Physicians, etc., as:	
					Schedule V Substances	Schedule II and III Substances
Medicinal Opium	1967	3,724	3,376	1	1,541	1,834
	1968	3,845	4,762	700	1,554	2,508
	1969	3,104	2,887	10	1,819	1,058
	1970	2,342	2,464	61	1,237	1,166
	1971	1,418	1,820	53	933	834
	1972	2,510	1,793	33	664	1,096
Morphine	1967	359	473	23	7	443
	1968	428	483	9	8	466
	1969	471	544	48	10	486
	1970	490	544	7	5	532
	1971	569	548	3	7	538
	1972	528	499	11	---	488
Hydromorphone (dihydromorphinone)	1967	58	52	1	---	51
	1968	34	72	1	---	71
	1969	66	41	1	---	40
	1970	55	55	1	---	54
	1971	67	38	1	---	37
	1972	44	61	1	---	60
Oxymorphone (numorphan)	1967	27	33	--	---	33
	1968	34	33	--	---	33
	1969	42	32	--	---	32
	1970	30	39	--	---	39
	1971	11	4	--	---	4
	1972	19	21	--	---	21

* The sum of columns 5,6 and 7 equals the figure expressed in column 4.

TABLE - YEARLY PRODUCTION AND USE OF THE PRINCIPAL NARCOTIC DRUGS, 1967-1972*
(In Kilograms - as Salts)

1	2	3	4	5	6	7
Name of Drug	Year	Production	Total dispositions	Exported** to other countries	Sold to Hospitals, Pharmacies Physicians, etc., as: Schedule V Substances	Schedule II and III Substances
Ethylmorphine	1967	98	81	15	5	61
	1968	47	61	2	4	55
	1969	48	25	3	3	19
	1970	44	55	--	3	52
	1971	86	53	20	4	29
	1972	59	113	57	---	56
Codeine	1967	27,369	22,257	406	8,084	13,767
	1968	31,609	39,276	351	10,949	27,976
	1969	28,482	28,482	175	11,355	16,952
	1970	30,596	29,801	201	9,448	20,152
	1971	34,015	35,139	745	8,657	25,737
	1972	39,799	38,942	1,925**	8,962	28,055
Dihydrocodeine	1967	50	53	--	---	53
	1968	78	81	--	---	81
	1969	82	68	--	---	68
	1970	84	163	--	---	163
	1971	162	165	--	---	165
	1972	253	261	--	---	261
Hydrocodone (dihydrocodeinone)	1967	529	502	42	---	460
	1968	528	773	40	---	733
	1969	963	521	66	---	455
	1970	803	705	59	---	646
	1971	718	590	105	---	485
	1972	808	832	91	---	741

* The sum of columns 5,6 and 7 equals the figure expressed in column 4.
** Exports include the base compounds in Schedule II and preparations in Schedules III and V.

TABLE - YEARLY PRODUCTION AND USE OF THE PRINCIPAL NARCOTIC DRUGS, 1967-1972*
(In Kilograms - as Salts)

1	2	3	4	5	6	7
Name of Drug	Year	Production	Total dispositions	Exported to other countries	Sold to Hospitals, Pharmacies, Phycians, etc., as:	
					Schedule V Substances	Schedule II and III Substances
Pethidine (Cemerol)	1967	10,161	12,884	186	---	12,698
	1968	12,780	18,703	190	---	13,513
	1969	13,451	12,236	178	---	12,058
	1970	10,141	12,917	190	---	12,727
	1971	17,032	12,833	196	---	12,637
	1972	12,909	13,047	201	---	12,846
Anileridine	1967	138	323	41	---	282
	1968	283	292	42	---	250
	1969	245	242	54	---	188
	1970	298	332	82	---	250
	1971	194	228	71	---	157
	1972	344	219	38	---	181
Methadone	1967	151	155	1	---	154
	1968	246	237	--	---	237
	1969	509	330	--	---	330
	1970	1,221	889	--	---	889
	1971	1,817	1,219	127	---	1,092
	1972	2,259	2,471	14	---	2,457
Alphaprodine (Nisentil)	1967	28	58	2	---	56
	1968	39	42	4	---	38
	1969	43	44	3	---	41
	1970	46	50	4	---	46
	1971	110	44	3	---	41
	1972	106	47	5	---	42

* The sum of columns 5,6 and 7 equals the figure expressed in column 4.

TABLE - YEARLY PRODUCTION AND USE OF THE PRINCIPAL NARCOTIC DRUGS, 1967-1972*
(In Kilograms - as Salts)

1	2	3	4	5	6	7
Name of Drug	Year	Production	Total dispositions	Exported to other countries	Sold to Hospitals, Pharmacies, Physicians, etc., as:	
					Schedule V Substances	Schedule II and III Substances
Oxycodone (Eucodal)	1967	806	651	10	---	641
	1968	678	792	5	---	787
	1969	981	913	15	---	898
	1970	1,008	1,234	27	---	1,207
	1971	1,406	1,229	29	---	1,200
	1972	1,181	1,013	21	---	992
Fentanyl	1969	3	1	--	---	1
	1970	---	---	--	---	---
	1971	---	2	--	---	2
	1972	---	2	--	---	2
Cocaine	1967	1,346	1,303	867	---	436
	1968	796	869	409	---	460
	1969	1,184	932	844	---	88
	1970	1,105	1,226	766	---	460
	1971	1,020	901	496	---	405
	1972	955	958	508	---	450

APPENDIX NO. 2 CON'T.

* The sum of columns 5,6 and 7 equals the figure expressed in column 4.

TABLE - YEARLY PRODUCTION AND USE OF THE PRINCIPAL NARCOTIC DRUGS, 1967-1972*
(In Kilograms - as Salts)

1	2	3	4	5	6	7
Name of Drug	Year	Production	Total dispositions	Exported to other countries	Sold to Hospitals, Pharmacies, Physicians, etc., as: Schedule V Substances	Schedule II and III Substances
Levorphanol	1967	18	8	1	---	7
	1968	8	7	--	---	7
	1969	8	8	1	---	7
	1970	7	7	1	---	6
	1971	16	6	--	---	6
	1972	11	8	1	---	7
Piminodine	1967	---	35	4	---	31
	1968	---	17	--	---	17
	1969	---	11	--	---	11
	1970	---	12	--	---	12
	1971	---	2	--	---	2
	1972	---	1	--	---	1
Thebaine**	1967	1,300				
	1968	908				
	1969	1,397				
	1970	1,623				
	1971	1,937				
	1972	3,093				

APPENDIX NO. 2 CON'T.

* The sum of columns 5,6 and 7 equals the figure expressed in column 4.
** Thebaine is utilized in the production of Oxycodone (dihydrohydroxycodeinone).

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APPENDIX III

ALPHABETICAL LISTING OF SUBSTANCES, SCHEDULE NUMBERS AND DRUG CODES

Name of Substance	Schedule No.	Drug Code
Acetyldihydrocodeine	I	9051
Acetyldihydrocodeinone	I	9315
Acetylmethadol	I	9601
Acetorphine (M-183)	I	9319
Allylprodine	I	9602
Alphacetylmethadol	I	9603
Alpha-Levo-N-Demethylmethadol	II	9249
Alphameprodine	I	9604
Alphamethadol	I	9605
Alphaprodine	II	9010
Amobarbital	II	2125
Amphetamine	II	1100
Anhalamine	I	7416
Anhalonidine	I	7417
Anhalonine	I	7419
Anileridine	II	9020
Apomorphine	II	9030
Barbital	IV	2145
Barbituric Acid Derivative	III	2100
Benzethidine	I	9606
Benzphetamine	III	1230
Benzylmorphine	I	9052
Betacetylmethadol	I	9607
Betameprodine	I	9608
Betamethadol	I	9609
Betaprodine	I	9611
Bezitramide	I	9800
Brallobarbital	III	2153
14-Bromocodeine	I	9109
4-Bromo-2,5-Dimethoxyamphetamine	I	7291
Bufotenine	I	7433
Butabarbital	III	2175
Butalbital	[illegible]	2165
Butobarbital	[illegible]	2185
Cannabidiol	[illegible]	7372
Cannabinol	I	7373
3-0-Carboxymethylmorphine	I	9322
Chloral Betalne	IV	2460
Chloral Hydrate	IV	2465
Chlorhexadol	III	2510
Chlorphentermine	III	1645
Chlortermine	III	1647
Cinnamoylcocaine	II	9183
Clonitazene	I	9612
Cocaine	II	9041
Coca Leaves	II	9040
Codeine	II(a)	9050
Codeine	III(d)(1)	9803
Codeine	III(d)(2)	9804

APPENDIX III CON'T.

Codeine	V	9100
Codeine Methylbromide	I	9070
Codeine-N-Oxide	I	9053
Codoxime	I	9102
Cuchygrine	I	9047
Cyclobarbital	III	2190
Cyprenorphine	I	9054
Desomorphine	I	9055
Detromoramide	I	9613
Dextrorphan	I	9614
Diacetylmorphine	I	9200
Diamorphine (Heroin)	I	9200
Diampromide	I	9615
Diethylpropion	IV	1610
Diethylthiambutene	I	9616
Diethyltryptamine	I	7434
Dihydrocodeine	II	9120
Dihydrocodeine	III(d)	9807
Dihydrocodeine	V	9121
Dihydromorphine	I	9145
Dimenoxadol	I	9617
Dimepheptanol	I	9618
2,5-Dimethoxy-4-Methylamphetamine	I	7395
Dimethylthiambutene	I	9619
Dimethyltryptamine	I	7435
Dioxaphetyl Butyrate	I	9621
Diphenoxylate	II	9170
Diphenoxylate	V	9171
Dipipanone	I	9622
Diprenorphine	II	9058
Drotebanol	I	9335
Ecgonine	II	9180
Ecgonine Benoylester	II	9187
Ecgonine Benzoylethylester	II	9181
Ecgonine Cinnamoylmethylester	II	9183
Ecgonine 2,6-Dimethylbuezoylmethylester	II	9184
Ecgonine Methylester	II	9185
Ecgonine Phenylacetylmethylester	II	9186
Ethchlorvynol	IV	2540
Ethinamate	IV	2545
Ethylmethylthiambutene	I	9623
Ethylmorphine	II	9190
Ethylmorphine	V	9192
Ethylmorphine Methyliodide	I	9195
Etonitazene	I	9624
Etorphine	II	9056
Etorphine-3-Methylether	I	9057
Etoxeridine	I	9625
Fenfluramine	IV	1670
Fentanyl	II	9801
Furethidine	I	9626
Glutethimide	III	2550

APPENDIX III CON'T.

Heptobarbital	III	2225
Heroin	I	9200
Hydrocodone	II	9193
Hydrocodone	III(d)(3)	9805
Hydrocodone	III(d)(4)	9806
Hydromorphinol	I	9301
Hydromorphone	II	9150
Hydroxypethidine	I	9627
Hygrine	I	9048
Ibogaine	I	7260
Isomethadone	I	9226
Ketobemidone	I	9628
Levomethorphan	I	9210
Levomoramide	I	9629
Levophenacylmorphan	I	9631
Levorphanol	II	9220
Lophorphorine	I	7420
Lysergic Acid	III	7300
Lysergic Acid Amide	III	7310
Lysergic Acid Diethylamide	I	7315
Marihuana (cannabis)	I	7360
Mazinol	III	1605
Meprobamate	IV	2820
Mescaline	I	7381
Metazocine	I	9240
Methadone	II	9250
Methadone-Intermediate	II	9254
Methamphetamine (Parenteral)	II	1400
Methamphetamine	II	1105
Methaqualone	II	2565
Methohexital	IV	2264
4-Methoxyamphetamine	I	7411
5-Methoxy-3, 4-Methylenedioxy Amphetamine (MMDA)	I	7401
Methyldesorphine	I	9302
Methyldihydromorphine	I	9304
Methyldihydromorphinone (Metopon)	I	9260
Methoxyamphetamine	I	7411
3,4-Methylenedioxy Amphetamine (MDA)	I	7400
Methylphenidate	II	1726
Methylphenobarbital	IV	2250
Methyprylon	III	2575
Monoacetylmorphine	I	9316
Moramide-Intermediate	I	9802
Morpheridine	I	9632
Morphine	II	9300
Morphine	III	9810
Morphine-3-Glucuronide	I	9329
Morphine Methylbromide	I	9305
Morphine Methylchloride	I	9323
Morphine Methylsulfonate	I	9306
Morphine-N-Oxide	I	9307

APPENDIX III CON'T.

Myrophine	I	9308
Naltrexone	II	9318
N-Ethyl-3-Piperidyl Benzilate	I	7487
Nicocodeine	I	9309
Nicodicodine	I	9103
Nicomorphine	I	9312
N-Methyl-3-Piperidyl Benzilate	I	7484
Nalorphine	III	9400
Noracymethadol	I	9633
Norlevophanol	I	9634
Normethadone	I	9635
Normorphine	I	9313
Norpipanone	I	9636
Opium-Raw Gum	II(a)	9600
Opium-Extracts	II(a)	9610
Opium-Fluid Extracts	II(a)	9620
Opium-Granulated	II(a)	9640
Opium-Powdered	II(a)	9639
Opium-Tincture (all percents)	II(a)	9630
Opium-Paregoric	III(d)	9655
Opium-Plant Forms (poppy)	II	9650
Opium-Preparations	V	9648
Oxycodone	II	9143
Oxymorphone	II	9652
Pantopon	II	9656
Paraldehyde	IV	2585
Pellotine	I	7418
Pentobarbital	II	2270
Pentobarbital Sodium	II	2280
Pethidine-Intermediate-A	II	9232
Pethidine-Intermediate-B	II	9233
Pethidine-Intermediate-C	II	9234
Petrichloral	IV	2591
Peyote	I	7415
Phenadoxone	I	9637
Phenampromide	I	9638
Phenazocine	II	9715
Phencyclidine	III	7471
Phendimetrazine	III	1620
Phenmetrazine	II	1630
Phenobarbital	IV	2285
Phenomarphan	I	9647
Phenoperidine	I	9641
Phentermine	IV	1640
Pholcodine	I	9314
Piminodine	II	9730
Piritramide	I	9642
Poppy Straw	II	9650
Probarbital	III	2305
Proheptazine	I	9643
Properidine	I	9644

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APPENDIX III CON'T.

Propiram	I	9649
Psilocybin	I	7437
Psilocyn	I	7438
Racemorphan	I	9732
Racemoramide	I	9645
Racemorphan	II	9733
Secobarbital	II	2315
Sulfondiethylmethane	III	2600
Sulfonethylmethane	III	2605
Sulfonmethane	III	2610
Talbutal	III	2324
Tetrahydrocannabinol(s)	I	7370
Thebacon	I	9315
Thebaine	II	9333
Thiobarbital	III	2326
Thiohexethal	III	2328
Thiotetrabarbital	III	2100
Trimeperidine	I	9646
3,4,5-Trimethoxy Amphetamine	I	7390
Tropacocaine	II	9045
Truxilline	II	9049

APPENDIX IV

CONVERSION FACTORS
FOR NARCOTIC ALKALOIDS AND THE MORE COMMON SALTS

In making conversions of narcotic salts to their equivalency in anhydrous alkaloids, multiply the quantity of the individual salt by the factor shown in column 3 opposite that particular salt. To determine the quantity of a designated salt which a given quantity of anhydrous alkaloid represents, multiply the quantity of the anhydrous alkaloid by the reciprocal shown in column 4 opposite that particular salt.

SUBSTANCE	SALT	% OF BASE	RECIPROCAL
2-Acetocodeine	HCl	92.02	1.1067
Acetomorphine	HCl	87.15	1.0981
1-3-Acetoxy-N-Cyanomorphinan	Bitartrate	68.52	1.4597
1-3-Acetoxy-N-Methylmorphinan	Bitartrate	69.04	1.4482
Acetorphine (M-183)	HCl	92.55	1.0810
Acetylbromodihydrocodeine	HBr	80.81	1.1598
Acetylcodeine	SO4	77.67	1.2880
Acetylcyanodihydronorcodeine	HCl	90.69	1.1025
Acetylcyanodihydronorcodeinone	HCl	90.32	1.1071
Acetyldihydrocodeine	HCl	90.40	1.1061
Acetyldihydrocodeinone	HCl	90.00	1.1070
Acetylethylmorphine	HCl	90.69	1.1025
Acetylethoydihydromorphine	HCl	90.45	1.1055
Acetylmethadol	HCl	89.99	1.1160
Acetylmorphine	HCl	89.98	1.1113
Acetylnorcodeine	HCl	89.98	1.1113
Acetylnormorphine	HCl	89.34	1.1192
Acetyl-N-Beta-Phenylethylnorcodeine	HCl	92.03	1.0865
Allobarbital	Na	90.05	1.1104
Allopropylbarbital	Na	90.14	1.105
Allylbarbital (Butalbital)	Na	90.70	1.1025
5-Allyl-5-(2-Hydroxypropyl)Barbituric Acid	Base	100.00	1.0000
Allylisovalerylurea	Base	100.00	1.0000
Allylmorphine	HCl	89.70	1.1147
N-Allylnorcodeine	HCl	92.22	1.0842
N-Allylnordihydrocodeinone	Bitartrate	68.59	1.4580
N-Allylnormorphine (Nalline)	HCl	89.52	1.5071
N-Allylnormorphine (Nalline)	HBr	79.59	1.2601
Allylprodine	HCl	88.74	1.127
Alphacetylmethadol	HCl	90.65	1.103
Alphacetylmethadol	HBr	81.37	1.294
Alpha-1-N-Demethylmethadol	HCl	85.96	1.163
Alphameprodine	HCl	88.32	1.133
Alphamethadol	HCl	89.52	1.117
Alphamethyltryptamine	HCl	82.69	1.2092
Alphaprodine	HCl	87.75	1.140

Alphenate (Alphenal)	Na	96.04	1.090
Amobarbital	Na	91.14	1.098
Amphetamine	Adipate	48.06	2.081
Amphetamine	Aspartate	50.39	1.984
Amphetamine	Carboxymethyl-celulose sodium	54.69	1.8281
Amphetamine	HCl	78.78	1.2696
Amphetamine	Phosphate-monobasic	57.97	1.724
Amphetamine	Phosphate-dibasic	73.39	1.625
Amphetamine	Resinate	39.00	2.564
Amphetamine	Saccharate	39.15	2.554
Amphetamine	Succinate	53.39	1.873
Amphetamine	Sulfate-monobasic	57.93	1.725
Amphetamine	Sulfate-dibasic	73.39	1.363
Amphetamine	Tartrate	47.40	2.110
Amylnormorphine	HCl	90.35	1.1067
Anhalamine	HCl	85.16	1.1742
Anhalonidine	Pictrate	49.35	2.026
Anhalonine	HCl	85.85	1.1647
Anileridine	2-HCl	82.85	1.111
Apocodeine	HCl	88.53	1.130
Apomorphine	HCl	85.44	1.1703
Apomorphine-3-methylether	HCl	88.55	1.1292
Aprobarbital	Na	90.14	1.105

-B-

Barbital	Na	88.94	1.1254
Barbituric Acid	Base	100.00	1.0000
Benzethidine	HBr	82.14	1.220
Benzethidine	HCl	90.94	1.100
Benxoylecgonine	HCl	64.02	1.9202
Benzoylecgonine Ethylester	HCl	58.36	1.6597
Benzethidine	HBr	82.14	1.220
Benzethidine	HCl	90.94	1.100
Benzphetamine	HCl	86.78	1.1522
Benzylmorphine	HCl	91.15	1.097
Benzylmorphine	Methylsulfonate	79.62	1.256
Betacetylmethadol	HCl	90.65	1.103
Betacetylmethadol	HBr	81.37	1.294
Beta-ethylsulfonylcodide	HCl	91.15	1.0970
Betameprodine	HCl	91.14	1.0971
Betamethadol	HCl	89.99	1.117
Betaprodine	HCl	87.75	1.140
Bezitramide	HCl	91.82	1.0890
Brallobarbital	Na	92.59	1.0801
5-Bromoallyl)-(1-methylbutyl)Barbituric Acid	Na	93.24	1.0724
Bromoallyl-N-Normorphine	HCl	89.36	1.1191
3-Bromocodeine	HCl (½HOH)	78.81	1.1022
14-Bromocodeine	HCl (1HOH)	71.80	1.3926
4-Bromo 2,5-Dimethoxylamphetamine	Base	100.00	1.0000

-B-

Bromodihydrocodeine	HCl (½HOH)	89.32	1.1195
2-Bromorphine	HCl (½HOH)	85.40	1.1709
14-Bromomorphine	HBr (4HOH)	76.99	1.2987
Btomotetrahydrodesoxycodeine	HCl	91.61	1.0915
Bufotenine	Methyliodide	40.99	2.4393
Butabarbital	Na	90.18	1.094
Butalbital	Na	85.49	1.098
Butallylonal	Na	92.95	1.073
5-(2-butenyl)-5-ethylbarbituric Acid	Na	90.14	1.1093
Butethal	Na	90.24	1.1084
Buthalital	Na	91.90	1.0876
Butobarbital	Na	90.24	1.1084
N-Butylallylbarbituric Acid	Na	90.70	1.1025
5-Sec-Butyl-5-Ethyl-2-Thiobarbituric Acid	Na		
N-Butylmorphine	HCl	88.28	1.1327
N-Butylnorcodeine	HCl	90.09	1.1099
N-(Sec)Butylnorcodeine	HCl	90.09	1.1099

-C-

Cannabis Sativa	Base	100.00	1.0000
Cannabidiol	Base	100.00	1.0000
Cannabinol	Base	100.00	1.0000
Carbethoxycodeine	HCl	91.06	1.0981
Carbethoxymethylmorphine	HCl	91.06	1.0981
Carbubarbital	Na		
Chloroaceticmorphine	HCl	90.51	1.1048
Chloral betaine	Base	100.00	1.0000
Chloral hydrate	Base	100.00	1.0000
Chlorhexadol	Base	100.00	1.0000
Chlorocodeine	SO_4 (4HOH)	77.60	1.2885
Chlorphentermine	HCl	83.48	1.1992
Chlortermine	HCl	83.55	1.197
Cinnamoylcocaine	Base	100.00	1.0000
Clonitazene	HCl	91.38	1.0942
Clonitazene	Methanesulfonate	80.10	1.2484
Cocaine	Base	100.00	1.0000
Cocaine	Borate	83.07	1.204
Cocaine	Citrate (dibasic)	75.95	2.634
Cocaine	Formate	86.83	1.152
Cocaine	Hydriodide	70.34	1.422
Cocaine	HBr	78.94	1.227
Cocaine	HCl	89.27	1.120
Cocaine	Lactate	77.10	1.297
Cocaine	Nitrate (2HOH)	82.80	2.316
Cocaine	Salicylate	68.71	1.456
Cocaine	Sulfate	75.57	1.324
Cocaine	Tartrate (dibasic)	80.17	2.495
Codeine	Acetate	75.69	1.3998
Codeine	Camphosulfonate	56.27	1.676
Codeine	Citrate	82.38	1.146
Codeine	Cyclohexenylethyl-barbiturate	55.90	1.689

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Codeine	Diallylbarbiturate	58.93	1.600
Codeine	Diethylbarbiturate	61.91	1.525
Codeine	Hydriodide	69.96	1.347
Codeine	HBr	71.89	1.3119
Codeine	HCl	80.67	1.1692
Codeine	Methylbromide	75.91	1.2425
Codeine	Phenylethylbarbiturate	56.36	1.6759
Codeine	Phosphate	70.52	1.3374
Codeine	Phosphate (hemihydrous)	73.65	1.2807
Codeine	Phosphate (1½HOH)	70.52	1.4172
Codeine	Salicylate	68.63	1.3792
Codeine	Sulfate (3HOH)	79.64	2.3672
Codeine	Sulfate (5HOH)	76.07	2.4795
Codeine Methylbromide	MeBr (1HOH)	75.91	1.3165
Codeine-N-Oxide	Base	100.00	1.0000
Codeineoxide	Base	100.00	1.0000
Codoxime	HCl	91.08	1.0980
Cuchygrine	Base	100.00	1.0000
Cyanodiacetyldihydronormorphine	HCl	91.29	1.0953
Cyanodihydronormorphine	HCl	89.10	1.1222
N-Cyanonor-Δ^{7}-Desoxycodeine	HCl	89.51	1.1170
Cyanonorcodeine	HCl	89.97	1.1113
Cyanonormorphine	HCl	89.04	1.1230
Cyclobarbital	Na	85.27	1.1730
N-Cyclohexymethylnorcodeine	HCl	91.50	1.0928
Cyclopal	Na	91.06	1.0941
Cyclopentenylallylbarbituric Acid	Base	100.00	1.0000
Cyclopentobarbital	Na	91.06	1.0981
N-Cyclopentylmethylnorcodeine	HCl	90.67	1.1028
N-Cyclopropylmethylnorcodeine	HCl	90.30	1.1074
Cyprenorphine	HCl	92.06	1.0860

-D-

Delta-7-Desoxycodeine	HCl	88.59	1.1287
Delta-8-Desoxycodeine	HCl	88.59	1.1287
Descodeine	HCl	88.67	1.1277
Desomorphine	HCl	88.15	1.1343
Desomorphine	HBr	77.00	1.2982
Desoxy-alpha-methylmorphimethine	HCl	89.07	1.1226
DET	Base	100.00	1.0000
Dextromoramide	HCl	91.49	1.0930
Dextromoramide	Bitartrate	72.32	1.4177
Dextrophan	Base	100.00	1.0000
Diacetyldihydromorphine	HCl	91.06	1.0981
Diacetylmorphine	HCl	87.15	1.1475
Diampromide	HCl	89.90	1.1127
N-DiBromoallylnorcodeine	HCl	92.99	1.0752
Dichlorocodeine	HCl	90.15	1.1092

Diethylaminophenobarbital	Na	93.53	1.0691
Diethylpropion	HCl	83.94	1.1783
Diethylthiambutene	HCl	88.87	1.1253
Dimethylaminobutyl-5-Ethylbarbituric Acid	Base	100.00	1.0000
Diethyltryptamine	Base	100.00	1.0000
Dihydrocodeine	Bitartrate	66.76	1.5001
Dihydrocodeine	HCl	89.20	1.3891
Dihydrocodeine	Phosphate	75.44	1.3253
Dihydrocodeine	Thiocynate	83.61	1.1963
Dihydrodesoxycodeine-D	HCl	88.67	1.1277
Dihydrodesoxymorphine-D	HCl	88.15	1.1343
Dihydroisocodeine	Bitartrate	66.76	1.4980
Dihydromorphine	HCl	88.74	1.1271
Dihydromorphine Dimethylether	HCl	78.28	1.2774
Dihydronormorphine	HCl	88.23	1.1333
Dihydrothebaine	HCl	89.57	1.1163
Dihydrothebainone	HCl	89.17	1.1213
Dihydroxydihydrocodeine	HCl	89.69	1.1148
Dimenoxadol	Base	100.00	1.0000
Dimepheptanol	HCl	89.52	1.1173
2,5-Dimethoxy-4-methylamphetamine	HCl	85.17	1.1741
Dimethylmorphine	HCl	89.27	1.1201
Dimethylmorphine	SO_4	76.16	1.3133
Dimethylthiambutene	HCl	87.83	1.1386
Dimethyltryptamine	Base	100.00	1.0000
Dinoracetylmethadol	HCl	91.31	1.0950
Dioxaphetyl Butyrdte	HCl	90.65	1.1002
Diphenoxylate	HCl	92.54	1.0806
Dipipanone	HCl	90.54	1.1044
Diprenorphine (M5050)	HCl	90.51	1.1052
Dipropionylmorphine	HCl	89.58	1.1163
DOM	HCl	85.15	1.1743
Drothebanol	HCl	90.27	1.1077

-E-

Ecgonidine	Base	100.00	1.0000
Ecgonine	HCl	83.55	1.1970
Ecgonine Benzyolester	Base (4HOH)	64.02	NA
Ecgonine Benzyolethylester	Base	58.36	NA
Ecgonine Cinnamoylmethylester	Base	56.73	NA
Ecgonine 2.6 Dimethylbenxoylmethylester	Base	55.60	NA
Ecgonine Phenylacetylmethylester	Base	64.02	NA
Ecgonine Methylester	Base	92.95	NA
Eldoral	Na	91.23	1.0990
Enallylpropymal	Na	90.71	1.1027
Ethallobarbital	Na	89.53	1.1122
Ethchlorvynol	Base	100.00	1.0000
Ethinamate	Base	100.00	1.0000
5-Ethyl (1-Methylpropyl)-2-Thiobarbituric Acid	Na	90.85	1.1006

Ethylmethylthiabutene	HCl	88.38	1.1317
Ethylmorphine	Campsulfonate	57.43	1.7417
Ethylmorphine	HBr	79.66	1.2585
Ethylmorphine	HCl	81.47	1.2317
Ethylmorphine	Methyliodide	68.82	1.4533
N-Ethylnorcodeine	HCl	89.58	1.1163
Ethylmorphinephenylethylbarbiturate	HCl	91.58	1.0923
Etonitazene	HCl	91.58	1.0923
Etorphine (M-99)	HCl	91.85	1.0887
Etorphine-3-Methylether	HCl		
Etoxeridine	Base	100.00	1.0000

-F-

Fenfluramine	HCl	86.39	1.1581
Fentanyl	Citrate	63.66	1.5710
Furethidine	Base	100.00	1.0000
5-Furfuryl-5-Isopropyl-Barbituric Acid	Na	94.29	1.0605

-G-

Glutethimide	Base	100.00	1.0000

-H-

Hashish	Base	100.00	1.0000
Hemocodeine (1HOH)	Base	95.67	1.0451
Heptabarbital	Na	91.98	1.0878
Heptobarbital	Na	90.85	1.1008
Heroin	HCl	87.15	1.1475
Heterocodeine	HCl (2HOH)	80.49	1.2423
Hexethal	Na	91.26	1.0913
Hexobarbital	Na	91.48	1.0933
Hydrocodone	Bitartrate	60.54	1.6835
Hydrocodone	Citrate	60.91	1.6420
Hydrocodone	HCl	80.50	1.2424
Hydrocodone	Terephthalate	64.31	1.5552
Hydromorphone	HCl	88.66	1.1279
Hydromorphinol	Base	100.00	1.0000
Hydromorphinone (dibasic)	SO_4	85.33	2.3440
Hydromorphinone	Terephthalate	63.21	1.1718
7-Hydroxycodeine	HCl	89.60	1.1159
9-Hydroxycodeine	HCl	89.62	1.1157
10-Hydroxycodeine	HCl	89.60	1.1159
14-Hydroxycodeine	HCl	89.62	1.1159
Hydroxycodeinone	HCl	89.57	1.1163
1-3-Hydroxy-N-Cyanomorphinan	HCl	87.36	1.1445
Hydroxy-N-Cyclopropylmethylmorphinan	SO_4	75.20	1.3297
10-Hydroxydihydrocodeine	HCl	89.60	1.1159

14-Hydroxydihydrocodeinone-6-carboxy-methyloxime	HCl	91.08	1.0978
N-Hydroxyethylnorcodeine	HCl	90.08	1.1100
14-Hydroxyhydromorphine	HCl	89.27	1.1201
3-Hydroxy-N-Methyl-Metamorphinan	HCl	87.32	1.1451
2-Hydroxymorphine	HCl	99.26	1.0074
14-Hydroxymorphine	HCl	99.26	1.0074
Hydroxypethidine	HCl	87.83	1.1384
Hydroxythebainone	HCl	88.66	1.1278
Hygrine	Base	100.00	1.0000
	-I-		
Ibogaine	HCl	89.48	1.1174
N-Isoamylnorcodeine	HCl	90.62	1.1039
Isocodeine	HCl	89.13	1.1219
Isomethadone	Base	100.00	1.0000
N-Isopropylnorcodeine	HCl	90.62	1.1034
Itobarbital	Na	85.49	1.0983
	-J-		
J.B. 318	HCl	90.16	1.1090
J.B. 336	HCl	89.79	1.1136
	-K-		
Ketobemidone	HCl	87.15	1.1474
	-L-		
Levomethorphan	Tartrate	64.38	1.5530
Levomoramide	Base	100.00	1.0000
Levophenacylmorphan	Methylsulfonate	79.00	1.2662
Levorphanol	HBr	76.07	1.3144
Levorphanol	Tartrate	58.00	1.7217
Lophophorine	HCl	86.57	1.1554
Lophophorine	Picrate	50.66	1.9745
Lysergic Acid	Base	100.00	1.0000
Lysergic Acid Amide	Base	100.00	1.0000
Lysergic Acid Diethylamide D	Tartrate	68.30	1.3528
Lysergic Acid Methyl Propylamide	Base	100.00	1.0000
	-M-		
Mazindol	Base	100.00	1.0000
MDA	Acetate	74.90	1.3350

MDA	HCl	83.12	1.2034
MDA	SO_4	64.65	1.5472
Mecloqualone	HCl	88.13	1.1346
Mephobarbital	Base	100.00	1.0000
Meprobamate	Base	100.00	1.0000
Mescaline	HCl	85.29	1.1729
Mescaline	Sulfate (2HOH)	61.18	1.6352
Mescaline	Acid Sulfate	68.29	1.4646
Mescaline	Aurichloride	57.45	1.7414
Mescaline	Platinichloride	36.21	2.7621
Mescaline	Picrate	47.98	2.0850
Metadihydrothebainone	HBr	78.83	1.2684
Metazocine	HCl	80.94	1.2357
Metazocine	HBr	74.08	1.3501
Methadol	HCl	89.52	1.1172
Methadone	Bitartrate	67.33	1.485
Methadone	HCl	89.57	1.119
Methadone Intermediate	Base	100.00	1.0000
Methallatal	Na	90.78	1.1019
Methamphetamine	HCl	80.35	1.245
Methamphetamine	Pot. Saccharate	41.57	2.409
Methamphetamine	SO_4	60.84	1.658
Methaqualone	HCl	87.28	1.1458
Methaqualone	SO_4	71.87	1.3918
Metharbital	Base	100.00	1.0000
Methitural	Sodium	92.59	1.0799
Methohexital	Sodium	91.91	1.0879
4-Methoxyamphetamine	HCl	83.09	1.2033
3-Methoxy-N-Methyl-Metamorphinan	HBr	77.03	1.2981
3-Methoxy-4-Hydro-N-Metamorphinan	HBr	78.88	1.2675
3-Methoxy-4, 5-Methylenedioxyamphetamine MMDA	HCl	85.16	1.1741
2-Methoxy-4, 5-Methylenedioxyamphetamine MMDA-2	Base	100.00	1.0000
3-Methoxy-6-Oxo-N-Methylmorphinan	HBr	77.60	1.2886
14-(3-Methylcrotyl)codeinone	Base	100.00	1.0000
Methyldesomorphine	HCl	88.59	1.1287
Methyldihydromorphine	HCl	89.20	1.1209
Methyldihydromorphinone (Metopon)		89.14	1.122
6-Methylenedihydrodesoxycodeine		89.07	1.1225
N-Methylnorcodeine (Codeine)	Base	100.00	1.0000
Methylphenidate	HCl	86.50	1.152
Methylphenobarbital (Mephobarbital)	Base	100.00	1.0000
N,N-Methyl-Propyllysergic Acid	Base	100.00	1.0000
Methylprylon	Base	100.00	1.0000
Mixed Alkaloids of Opium	Base	100.00	1.0000
Mixed Alkaloids of Opium (as AMA)		50.00	1.0000
Moramide Intermediate	Base	100.00	1.0000
Morpheridine	Base	100.00	1.0000
Morphine	Acetate (hydrous)	71.44	1.317
Morphine Alkaloid, Hydrous		94.06	1.0632

Morphine (Tribasic)	Citrate	81.67	1.1523
Morphine	Gluconate	59.25	1.588
Morphine	Hydriodide	63.51	1.482
Morphine	Hydrobromide	70.93	1.327
Morphine	Hydrochloride	75.92	1.239
Morphine	Hypophosphite	81.22	1.158
Morphine	Lactate	76.01	1.239
Morphine (dibasic)	Meconate (5HOH)	66.29	2.840
Morphine	Methylbromide	74.98	1.255
Morphine	Methylchloride	84.96	1.107
Morphine	Methylsulfonate	74.79	1.258
Morphine	Mucate	57.58	1.635
Morphine-N-Oxide	Quinate	59.84	1.661
Morphine	Phenylpropionate	65.50	1.436
Morphine (monobasic)	Phosphate (½HOH)	72.73	1.294
Morphine (dibasic)	Phosphate (7HOH)	72.64	1.229
Morphine	Stearate	50.08	1.879
Morphine	Sulfate (hydrous)	75.20	1.242
Morphine	Tartrate (3HOH)	73.65	1.278
Morphinemethoxymethylether	HCl	90.03	1.1106
Morphotehbaine	HCl	89.07	1.1226
Myrophine	Base	100.00	1.0000

-N-

Nalline (N-allylnormorphine)	HCl	89.52	1.507
Nalline (N-allylnormorphine)	HBr	79.59	1.260
Narcobarbital	Base	100.00	1.0000
Nealbarbital	Base	100.00	1.0000
Nicocodeine	HCl	91.72	1.090
Nicodicodeine	HCl	93.15	1.074
Nicomorphine	HCl	93.15	1.074
NIH 7574 (Benzethidine)	HCl	90.94	1.100
NIH 7574 (Benzethidine)	HBr	82.14	
Nitrocodeine		90.42	1.10[illegible]
Noracymethadol	Gluconate	63.38	1.578
Noracymethadol	HCl	90.30	1.1073
Norapomorphine Dimethylether P Toluene Sulfonamide	HCl	92.27	1.0837
Norcodeine	HCl	88.66	1.1277
Norcynodihydrocodeinone	HCl	90.22	1.1083
Norecgonine	HCl	82.35	1.2142
Norhexobarbital	Base	100.00	1.0000
Norlevorphanol	HBr	75.05	1.3333
Normeperidine (See Norpethidine)			
Normethadone	HCl	89.00	1.123
Normorphine	HCl	88.15	1.1343
Noroxymorphone	HCl	86.83	1.1516
Norpipanone	HCl	90.19	1.1086
N-Phenylethylnorcodeine		91.45	1.0933
N-Propylnorcodeine	HCl	89.99	1.1111

Opium - See Page 259			
Oxycodone	Bitartrate	67.75	1.476
Oxycodone	Camphosulfonate	57.58	1.737
Oxycodone	Homatropine terephthalate	41.18	1.4001
Oxycodone	HCl	89.63	1.1155
Oxycodone	HCl-Terephthalate	88.93	1.1244
Oxycodone	Phenylpropionate	67.76	1.476
Oxycodone	Phosphate (3HOH)	76.29	1.311
Oxycodone	Terephthalate	65.50	1.5271
Oxymorphone	HCl	84.60	1.799

-P-

Pantopon	Mixed alkaloids of Opium	100.00	1.0000
Pantopon	As Morphine	50.00	2.000
Paraldehyde	Base	100.00	1.0000
Para-Toluenesulfonylcodeine	HCl	92.55	1.0803
PCP	HBr	75.04	1.3324
PCP	HCl	86.97	1.1498
PCP	SO_4	71.27	1.4029
Pellotine	HCl	86.68	1.1536
Pellotine	HI	64.97	1.5390
Pentenal	Na	77.83	1.2847
Pentobarbital	Na	90.73	1.1023
Pethidine	HCl	87.14	1.1475
Pethidine-A	Base	100.00	1.0000
Pethidine-B	HBr	74.25	1.3468
Pethidine-B	HCl	86.40	1.562
Pethidine-C	Base	100.00	1.0000
Petrichloral	Base	100.00	1.0000
Phenodoxone	HCl	90.60	1.1040
Phenampromide	Base	100.00	1.0000
Phenazocine	HBr	78.14	1.2800
Phenazocine	HCl	89.81	1.1136
Phencyclidine (See PCP)			
Phendimetrazine	Bitartrate	56.01	1.7847
Phendimetrazine	HBr	70.29	1.4230
Phendimetrazine	HCl	84.00	1.1912
Phenmetrazine	HCl	82.98	1.2059
Phenobarbital	Calcium	85.05	1.1756
Phenobarbital	Na	91.36	1.0948
Phenomorphinan	Base	100.00	1.0000
Phenoperidine	HCl	90.97	1.0995
Phentermine	Bitartrate	56.04	1.7847
Phentermine	HCl	80.36	1.2443
5-Phenyl-Allylbarbituric Acid	Na	96.04	1.0940
14-(3-Phenyl-2-Buten-1 Yl)-Codeinone		92.16	1.0850
Phenetharbital	Base	100.00	1.0000
N-Phenylethylnorcodeine	HCl	91.45	1.0933
Phetharbital	Base	100.00	1.0000

Pholcodine	Quaiacolsulfonate	66.12	1.4470
Pholcodine	HCl	91.62	1.0443
Pholcodine	Phenylacetate	74.52	1.2836
Pholcodine	Sulfonate	83.09	1.1509
Pholcodine	Tartrate	72.64	1.3171
Piminodine	Ethanesulfonate	76.89	1.3004
Piminodine	Dichloride	83.40	1.1935
Piritramide	Base	100.00	1.0000
Probarbital	Calcium (3HOH)	67.81	1.4749
Probarbital	Na	90.02	1.1110
Proheptazine	Base	100.00	1.0000
Propallylonal	Na	92.63	1.0794
Properidine	HCl	87.75	1.1395
Propionylcodeine	HCl (3HOH)	83.06	1.2039
Propionylcodeine	Acetate	85.55	1.1688
Propionylcodeine	HI (1HOH)	70.88	1.4106
Propionylcodeine	Sulfate (3HOH)	68.68	1.4558
Propiram	Fumarate	70.38	1.4219
Propylbarbital	Na	89.60	1.1159
N-Propylnorcodeine	HCl	89.69	1.1148
Pseudocodeine	Base	100.00	1.0000
Psilocybin	Base	100.00	1.0000
Psilocyn	Base	100.00	1.0000

-R-

Racemorphan	HBr	74.11	1.3497
Racemorphan	HCl	87.58	1.1420
Racemorphan	Tartrate	63.17	1.5834
Rectidon	Na	93.26	1.0724

-S-

Secobarbital	Na	91.17	1.0848
STP	Base	100.00	1.0000
Spirobarbital	Base	100.00	1.0000
Succinylcodeine (Pentahydrate)	HCl (1HOH)	81.65	1.2247
Sulfondiethylmethane	Base	100.00	1.0000
Sulfonethylmethane	Base	100.00	1.0000
Sulfonmethane	Base	100.00	1.0000

-T-

Talbutal	Base	100.00	1.0000
Tetrabarbital	Base	100.00	1.0000
Tetrabromomorphine (dihydrate)	SO_4 (1HOH)	91.89	1.0882
Tetrahydrocannabinol(s)	Base	100.00	1.0000
Tetrahydrodesoxycodeine	HCl	86.34	1.1582

Tetrahydrodesoxycodeine	HI (½HOH)	69.20	1.4450
Tetrahydrodesoxymorphine	HI	65.83	1.5190
Tetrahydrodesoxymorphine	Salicylate	66.43	1.5052
Thebacon	HCl	90.36	1.1092
Thebaine	HCl (1HOH)	85.15	1.743
Thebaine	Tartrate	67.50	1.8025
Thialbarbital	Na	92.01	1.0871
Thiamylal	Base	100.00	1.0000
Thioamobarbital	Na	89.31	1.1196
Thiobarbital	Na	89.72	1.150
Thiohexethal	Na	67.56	1.4800
Thionarcon	Na	92.27	1.0837
Thiopental	Na	92.00	1.0870
Thiotetrabarbital	Na	91.76	1.0897
Trimeperidine	HCl	88.30	1.1329
3,4,5-Trimethoxyamphetamine (TMA)	Base	100.00	1.0000
Tropacocaine	Base	100.00	1.0000
Truxilline	Base	100.00	1.0000

-V-

Vinbarbital	Na	90.66	1.1029

APPENDIX V

MANUFACTURERS OF BASIC SUBSTANCES

Narcotics

Name and address of the firms authorized to manufacture	Drugs authorized to be manufactured 1973	Drugs actually manufactured during 1973
Abbott Laboratories 1400 Sheridan Road North Chicago, Illinois 60064	Opium, powdered	
Eli Lilly & Company 740 S. Alabama Street Indianapolis, Indiana 46206	Opium tinctures and extracts	Methadone
Endo Laboratories, Inc. 1000 Stewart Avenue Garden City, New York 11530	Oxymorphone Hydrocodone Oxycodone	Oxymorphone Hydrocodone Oxycodone
Hoffmann-LaRoche, Inc. 340 Kingsland Street Nutley, New Jersey 07110	Alphaprodine Levorphanol Alkaloids of Opium	Alphaprodine Levorphanol Opium
Knoll Pharmaceutical Company 30 N. Jefferson Road Whippany, New Jersey 07981	Hydromorphone	Hydromorphone
Mallinckrodt Chemical Works Second & Mallinckrodt Streets St. Louis, Missouri 63160	Opium, powdered, and extract Morphine Codeine Dihydrocod ne Thebaine Diphenoxylate Pethidine Intermediate-B Hydrocodone Methadone Ethylmorphine	Opium, powdered, and extract Morphine Codeine Dihydrocodeine Thebaine Diphenoxylate Pethidine Intermediate-B Hydrocodone Methadone Ethylmorphine
Merck & Company, Inc. Lincoln Avenue Rahway, New Jersey 07065	Opium, powdered granulated and extracts Morphine Codeine Ethylmorphine Thebaine Cocaine Anileridine Hydrocodone Oxycodone	Opium, powdered granulated and extracts Morphine Codeine Ethylmorphine Thebaine Cocaine Anileridine Hydrocodone Oxycodone

APPENDIX V CON'T.

Name and address of the firms authorized to manufacture	Drugs authorized to be manufactured 1973	Drugs actually manufactured during 1973
S. B. Penick & Company 158 Mt. Olivet Avenue Newark, New Jersey 07114	Opium, powdered, and extract Morphine Codeine Ethylmorphine Hydrocodone Thebaine Pethidine Fentanyl Methadone Dihydrocodeine	Opium, powdered and extract Morphine Codeine Ethylmorphine Hydrocodone Thebaine Pethidine Fentanyl Methadone Dihydrocodeine
Stepan Chemical Company Maywood Division 100 W. Hunter Avenue Maywood, New Jersey 07607	Cocaine	Cocaine
Winthrop Laboratories 33 Riverside Avenue Rensselaer, New York 12144	Pethidine	Pethidine
Wyeth Laboratories, Inc. 611 East Nield Street West Chester, Pennsylvania 19380	Pethidine	Pethidine
	Non-Narcotics	
Arenol Chemical Corporation 40-33 23rd Street Long Island City, New York 11101	Amphetamine Methamphetamine	Amphetamine Methamphetamine
Smith Kline & French Labs. 1500 Spring Garden Street Philadelphia, Pa. 19101	Amphetamine	Amphetamine
William H Rorer, Inc. 500 Virginia Drive Fort Washington, Pa. 19034	Methaqualone	Methaqualone
Western Fher Laboratories Division of Fher Corp. Ltd. P. O. Box 4108 Ponce, Puerto Rico 00731	Phenmetrazine	Phenmetrazine

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Alkaloid or Salt	Conversion Factors: To Anhydrous Morphine	Conversion Factors: To 10 percent Opium
Morphine alkaloid, hydrous	0.9406	9.406
Morphine acetate, hydrous	.7143	7.143
Morphine hydrobromide, hydrous	.7093	7.093
Morphine hydrochloride, hydrous	.7592	7.592
Morphine meconate, hydrous	.6629	6.629
Morphine sulphate, hydrous	.7520	7.520
Methylmorphine or codeine alkaloid, anhydrous .:	.9532	9.532
Methylmorphine or codeine alkaloid, hydrous	.8990	8.990
Methylmorphine or codeine acetate, anhydrous ...	.7939	7.939
Methylmorphine or codeine hydrobromide, hydrous.	.6854	6.854
Methylmorphine or codeine hydrochloride, hydrous	.7673	7.673
Methylmorphine or codeine phosphate, hydrous ...	.6723	6.723
Methylmorphine or codeine sulphate, hydrous	.7252	7.252
Ethylmorphine alkaloid, hydrous	.8610	8.610
Ethylmorphine alkaloid, anhydrous	.9105	9.105
Ethylmorphine hydrochloride (dionin), hydrous ..	.7394	7.394
Dihydromorphinone hydrochloride (dilaudid), anhydrous	.8867	8.867
Apomorphine, anhydrous	1.0674	10.674
Apomorphine hydrochloride, hydrous	.9122	9.122
Hydrocodone alkaloid, anhydrous	.9531	9.531
Hydrocodone hydrochloride, hydrous (2HOH).......	.7674	7.674
Hydrocodone bitartrate, hydrous (2½HOH)	.5771	5.771
Dihydrocodeine alkaloid, anhydrous	.9470	9.470
Dihydrocodeine hydrochloride	.8447	8.447
N-allylnormorphine alkaloid, anhydrous	.9160	9.160
N-allylnormorphine hydrochloride	.8203	8.203
Pholcodine	.9162	9.162
Opium (granular or powder)	.1000	1.000
Opium tincture	.0450	0.450
Opium extract	.2000	2.000
Dover's powder	.0100	0.100

APPROXIMATE CONVERSIONS FROM
AVOIRDUPOIS TO METRIC

Grains		Milligrams		Grams	Grains		Milligrams		Grams
1/8	=	8.1	or	.0081	46	=	2981	or	2.981
1/4	=	16.2	"	.0162	47	=	3046	"	3.046
1/2	=	32.4	"	.0324	48	=	3110	"	3.110
3/4	=	48.6	"	.0486	49	=	3175	"	3.175
1	=	65	"	.065	50	=	3240	"	3.240
2	=	130	"	.130	51	=	3305	"	3.305
3	=	194	"	.194	52	=	3370	"	3.370
4	=	259	"	.259	53	=	3434	"	3.434
5	=	324	"	.324	54	=	3499	"	3.499
6	=	389	"	.389	55	=	3564	"	3.564
7	=	454	"	.454	56	=	3629	"	3.629
8	=	518	"	.518	57	=	3694	"	3.694
9	=	583	"	.583	58	=	3758	"	3.758
10	=	648	"	.648	59	=	3823	"	3.823
11	=	713	"	.713	60	=	3888	"	3.888
12	=	778	"	.778	61	=	3953	"	3.953
13	=	842	"	.842	62	=	4018	"	4.018
14	=	907	"	.907	63	=	4082	"	4.082
15	=	972	"	.972	64	=	4147	"	4.147
16	=	1037	"	1.037	65	=	4212	"	4.212
17	=	1102	"	1.102	66	=	4277	"	4.277
18	=	1166	"	1.166	67	=	4342	"	4.342
19	=	1231	"	1.231	68	=	4406	"	4.406
20	=	1296	"	1.296	69	=	4471	"	4.471
21	=	1361	"	1.361	70	=	4536	"	4.536
22	=	1426	"	1.426	71	=	4601	"	4.601
23	=	1490	"	1.490	72	=	4666	"	4.666
24	=	1555	"	1.555	73	=	4730	"	4.730
25	=	1620	"	1.620	74	=	4795	"	4.795
26	=	1685	"	1.685	75	=	4860	"	4.860
27	=	1750	"	1.750	76	=	4925	"	4.925
28	=	1814	"	1.814	77	=	4990	"	4.990
29	=	1879	"	1.879	78	=	5054	"	5.054
30	=	1944	"	1.944	79	=	5119	"	5.119
31	=	2009	"	2.009	80	=	5184	"	5.184
32	=	2074	"	2.074	81	=	5249	"	5.249
33	=	2138	"	2.138	82	=	5314	"	5.314
34	=	2203	"	2.203	83	=	5378	"	5.378
35	=	2268	"	2.268	84	=	5443	"	5.443
36	=	2333	"	2.333	85	=	5508	"	5.508
37	=	2398	"	2.398	86	=	5573	"	5.573
38	=	2462	"	2.462	87	=	5638	"	5.638
39	=	2527	"	2.527	88	=	5702	"	5.702
40	=	2592	"	2.592	89	=	5767	"	5.767
41	=	2657	"	2.657	90	=	5832	"	5.832
42	=	2722	"	2.722	91	=	5897	"	5.897
43	=	2786	"	2.786	92	=	5962	"	5.962
44	=	2851	"	2.851	93	=	6026	"	6.026
45	=	2916	"	2.916	94	=	6091	"	6.091

These conversions are equivalents only. In some cases the expressed quantity has been rounded off to the nearest whole number.

APPROXIMATE CONVERSIONS FROM AVOIRDUPOIS TO METRIC

Grains		Milligrams		Grams	Grains		Milligrams		Grams
95	=	6156	or	6.156	100	=	6480	or	6.480
96	=	6221	"	6.221	200	=	12960	"	12.960
97	=	6286	"	6.286	300	=	19440	"	19.440
98	=	6350	"	6.350	400	=	25920	"	25.920
99	=	6415	"	6.415	(1 oz) = 437.5	=	28350	"	28.350

Avoirdupois Ounces		Pounds	=	Grams		Kilograms
1/8			=	3.544		
1/4			=	7.088		
3/8			=	10.631		
1/2			=	14.175		
1			=	28.350		
2			=	56.700		
3			=	85.050		
4	or	1/4	=	113.400	or	.113
5			=	141.750		
6			=	170.100		
7			=	198.450		
8	"	1/2	=	226.800	"	.227
9			=	255.150		
10			=	283.500		
11			=	311.850		
12	"	3/4	=	340.200	"	.340
13			=	368.550		
14			=	396.900		
15			=	425.250		
16	"	1	=	453.600	"	.454
20	"	1.25	=	567.000	"	.567
25	"	1.5625	=	708.750	"	.709
30	"	1.875	=	850.500	"	.851
32	"	2	=	907.200	"	.907
35.274	"	2.2046	=	1000.000	"	1.000
40	"	2.5	=	1134.000	"	1.134
48	"	3	=	1360.800	"	1.361
50	"	3.125	=	1417.500	"	1.418
64	"	4	=	1814.400	"	1.814
75	"	4.6875	=	2126.250	"	2.126
80	"	5	=	2268.000	"	2.268
96	"	6	=	2721.600	"	2.722
100	"	6.25	=	2835.000	"	2.835
112	"	7	=	3175.200	"	3.175
128	"	8	=	3628.800	"	3.629
144	"	9	=	4082.400	"	4.082
160	"	10	=	4536.000	"	4.536
200	"	12.5	=	5670.000	"	5.670

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Ounces		Pounds		Grams		Kilograms
300	"	18.75	=	8505.000	"	8.505
320	"	20	=	9072.000	"	9.072
400	"	25	=	11340.000	"	11.340
480	"	30	=	13608.000	"	13.608
500	"	31.25	=	14175.000	"	14.175
600	"	37.5	=	17010.000	"	17.010
640	"	40	=	18144.000	"	18.144
700	"	43.75	=	19845.000	"	19.845
800	"	50	=	22680.000	"	22.680
1200	"	75	=	34020.000	"	34.020
1600	"	100	=	45360.000	"	45.360
4800	"	300	=	136080.000	"	136.080
8000	"	500	=	226800.000	"	226.800
16000	"	1000	=	453600.000	"	453.600
1 short ton =		2000	=	907200.000	"	907.200
1 metric ton =		2204.6	=	1000000.000	"	1000.000

These conversions are equivalents only. In some cases the expressed quantity has been rounded off to the nearest whole number.

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